United States
Department of
Agriculture

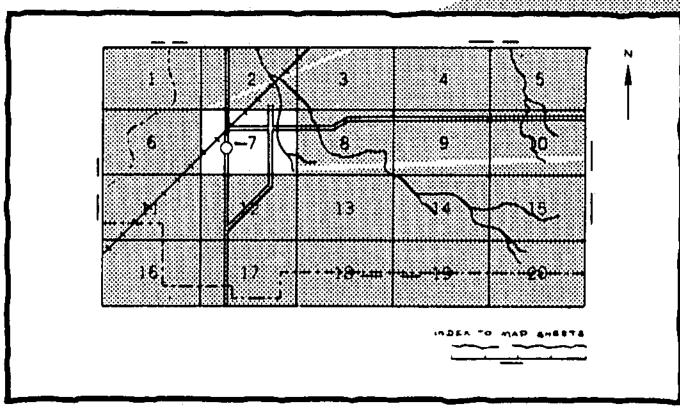
Soil
Conservation
Service

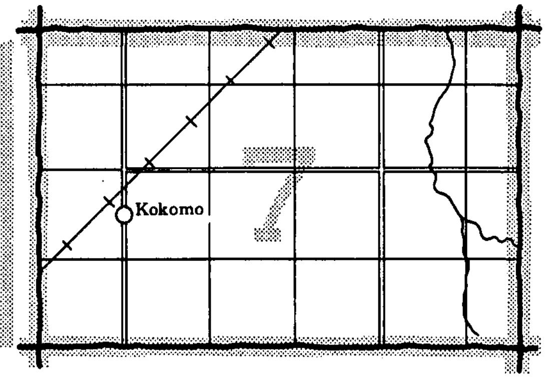
In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Knox County, Illinois

HOW TO USE

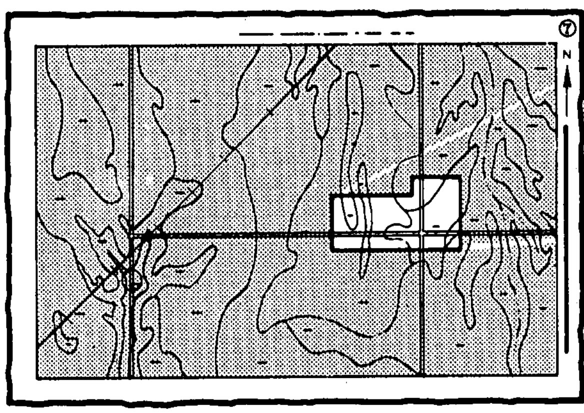
1. Locate your area of interest on the "Index to Map Sheets."

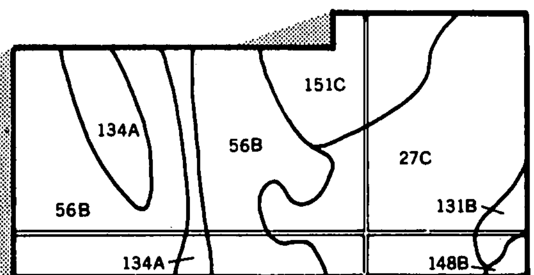




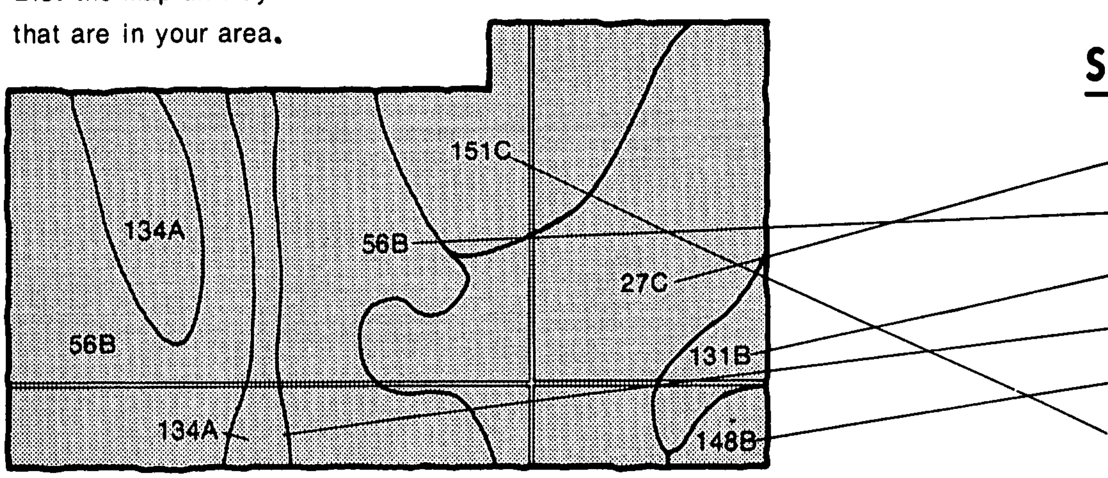
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.





4. List the map unit symbols that are in your area.

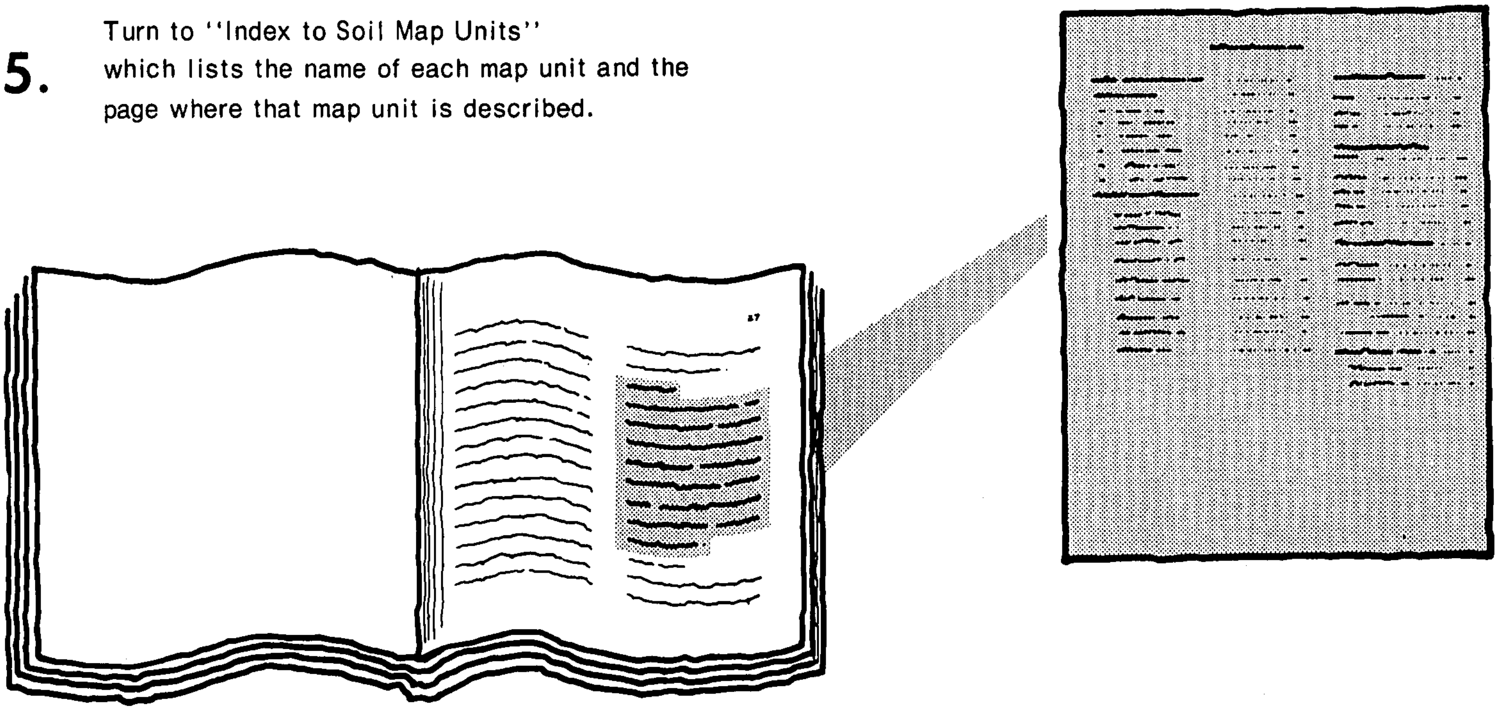


Symbols

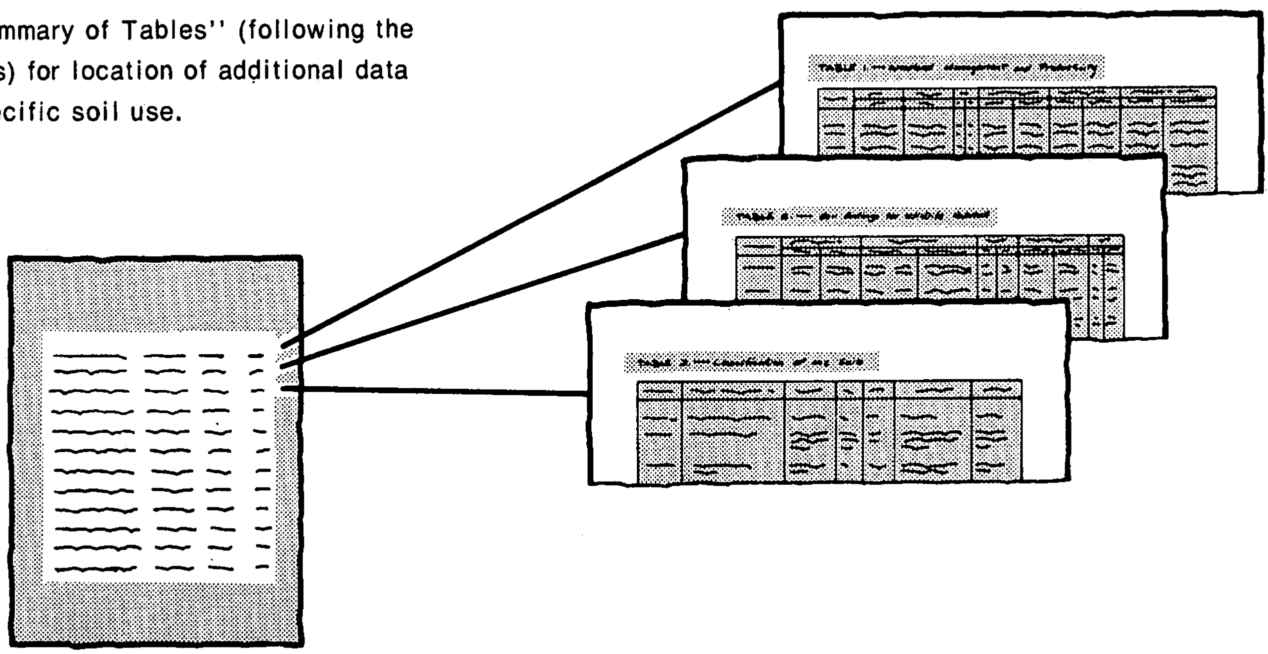
27C
56B
131B
134A
148B
151C

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Knox County Soil and Water Conservation District. The cost was shared by the Knox County Board.

This soil survey is Illinois Agricultural Experiment Station Soils Report No. 121.

Cover: A protective cover of crop residue on a Fayette soil.

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Soil Series

Issued October 1986

Index to Map Units

Summary of Tables

Foreword

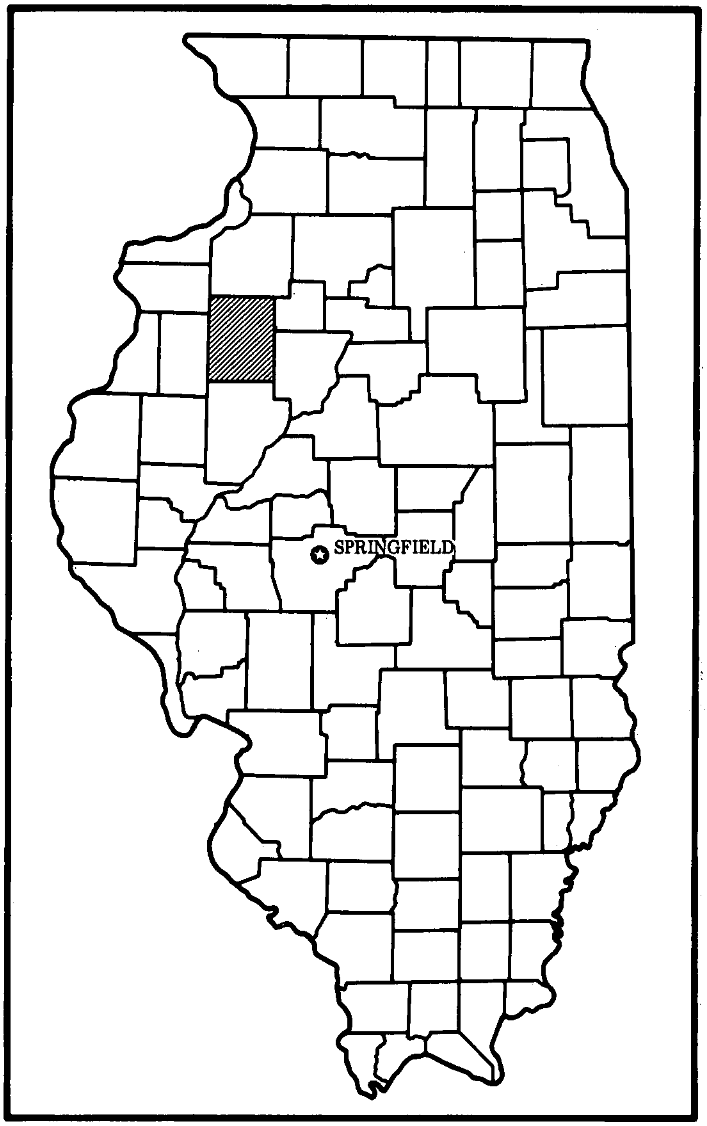
This soil survey contains information that can be used in land-planning programs in Knox County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service



Location of Knox County in Illinois.

Soil Survey of
Knox County, Illinois

By Roger D. Windhorn, Soil Conservation Service

Fieldwork by Roger D. Windhorn, Gary W. Goodrich, Mike E. Lilly, and
Charles L. Love, Soil Conservation Service, and
Mark W. Bramstedt, Bruce J. Houghtby, Mike F. Kuhn, and Mark Matusiak,
Knox County

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
Illinois Agricultural Experiment Station

KNOX COUNTY is in the northwestern part of Illinois. It has a total area of 466,560 acres, or about 729 square miles. According to the 1980 census, it has a population of 61,344. Galesburg, the county seat, has a population of 35,421.

This soil survey updates the surveys of Knox County published in 1904, 1913, and 1977 (*3, 4, 6*). It provides more information and larger maps, which show the soils in greater detail.

General Nature of the County

This section gives general information about Knox County. It briefly describes settlement and development, farming, physiography and drainage, and climate.

Settlement and Development

Several Indian tribes had inhabited the survey area prior to the establishment of the first non-Indian settlements (*14*). The Potawatomi Indians were the latest inhabitants. They established several villages near a ford of the Spoon River, at the site of the present-day town of Maquon.

In 1816, U.S. Government surveyors charted the rectangular grid system of land division into 160-acre parcels. These parcels were used to reward veterans of the Revolutionary War and the War of 1812. The county boundaries were established in 1825, and the county was formally organized in 1830, which was 2 years after the first permanent settlers arrived.

The early settlers preferred to locate near the forested areas because of the availability of wood, fear of prairie fires and wind, and the belief that the prairies were infertile. After the Black Hawk War, more settlers began to arrive since the fear of Indian attacks was diminished.

Knoxville (originally named Henderson) was established in 1831. It was the first town and county seat platted in the county. In 1837, George Washington Gale founded Galesburg, which was made the county seat during the same year. After it became the site for the conjunction of railroad lines, this town began to flourish as a major marketing center. Other towns were established as water stops along the rail lines or as market centers. Galesburg currently has numerous factories that manufacture a wide variety of products. The railroads also provide employment for many persons.

Much of Knox County is underlain by bituminous coal. About 21,164 acres has been disturbed by surface mining. Mining began around 1920.

Transportation systems are well developed. The county has eight state highways, two U.S. highways, one interstate highway, two railroad lines, one municipal airport, and numerous county roads.

Farming

The primary enterprise in the county is farming. Corn and soybeans are the main crops. Grasses and legumes are also grown, and many farms have livestock.

In 1978, the county had 1,346 farms, which made up about 414,044 acres, or nearly 89 percent of the total land area (*12*). The total acreage of cropland was 329,983 acres. Of this total, 266,815 acres was planted to corn and soybeans and 8,081 acres was planted to small grain. About 20,133 acres was used for hay.

In 1978, the county had 56,672 head of cattle, of which a total of 43,994 was sold (*12*). The number of hogs and pigs totaled 169,761 head, and the number of sheep and lambs totaled 2,577 head.

Physiography and Drainage

Knox County is mainly on a loess-covered Illinoian till plain. Glacial ice, running water, and windblown deposits are the main factors that have determined the landforms in the county (*8*). The northern and western parts of the county generally are gently rolling to nearly level, while the southern and southeastern parts are much more diverse. The landscape is especially diverse in areas along the Spoon River and its tributaries where erosion has caused a 50- to 200-foot drop in elevation below the general level of the adjacent uplands.

The highest point in the county is about 875 feet above sea level. It is on Pilot Knob, in the northwestern part of the county. Pilot Knob is possibly a remnant of the Table Grove recessional moraine, which was deposited by the Illinoian glacier. The lowest point, at a spot in London Mills where the Spoon River leaves the county, is about 534 feet above sea level.

Below the surface deposits of windblown silt and glacial till are extensive deposits of Pennsylvanian shale. This shale varies in composition and occurs as outcrops, generally near the base of steep slopes. Much of the county is underlain by bituminous coal, which is within the shale deposits. The upper two seams of coal have been surface mined, primarily in the eastern and southern parts of the county.

An elevated ridge cutting across the northwestern part divides the county into two main drainage areas (*8*). In areas southeast of this ridge, drainage is directed toward the basin of the Illinois River. The Spoon River and its tributaries drain about 588 square miles of the areas in the county that are within this basin. Walnut, French, Haw, Littlers, and Court Creeks are a few of the major tributaries. Kickapoo Creek, which also is in the basin of the Illinois River, drains about 12 square miles in the southeast corner of the county. It empties directly into the Illinois River.

In areas northwest of the elevated ridge, drainage is directed toward the basin of the Mississippi River. Pope and Henderson Creeks drain the northwestern part of the county. They empty directly into the Mississippi River. Cedar Fork eventually empties into Henderson Creek outside the county boundaries.

The county has about 2,500 acres of impounded water. Spoon Lake is the largest impoundment. It is about 580 acres in size. Lake Storey and Lake Bracken are the other major lakes. The rest of the impounded water is in areas that formerly were surface mined.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Knox County is cold in winter and quite hot in summer. Occasional cool spells occur in summer. Precipitation during the winter frequently occurs as snowstorms. During the warm months, when warm moist air moves in from the south, the precipitation is chiefly showers, which are often heavy. The total annual rainfall is normally adequate for corn, soybeans, and small grain.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Galesburg, Illinois, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 25 degrees F, and the average daily minimum temperature is 17 degrees. The lowest temperature on record, which occurred at Galesburg on December 21, 1963, is -22 degrees. In summer the average temperature is 73 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on July 1, 1956, is 100 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual precipitation is about 36 inches. Of this, 24 inches, or about 66 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 4.9 inches at Galesburg on September 13, 1961. Thunderstorms occur on about 50 days each year.

The average seasonal snowfall is about 26 inches. The greatest snow depth at any one time during the period of record was 15 inches. On the average, 22 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 12 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and

management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Map Unit Descriptions

This section describes the map units in the survey area at two levels of detail. The general soil map units, called soil associations, are described first and then the detailed map units. Most of the general soil map units represent the soils of major extent in the survey area. The detailed map units represent all of the named soils in the survey area.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

In some areas the general soil map of Knox County does not join with that of Henry County. Also, some of the names of the associations do not agree across the county line. Differences result from variations in the extent of the major soils in the associations. The soils or parent materials in these associations are similar, and the soils have similar potentials for major land uses. The differences in the association names do not significantly affect the use of the maps for general planning.

1. Ipava-Sable Association

Nearly level, somewhat poorly drained and poorly drained soils formed in loess on uplands

This association consists of soils on broad plains, ridgetops, and flats and in depressions and shallow drainageways in the uplands. Slopes range from 0 to 3 percent.

This association makes up 9 percent of the county. It is about 50 percent Ipava soils, 30 percent of Sable soils, and 20 percent minor soils (fig. 1).

Ipava soils are on the higher parts of the landscape. They are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is mottled and friable. The upper part is brown silty clay loam, the next part is dark grayish brown silty clay, and the lower part is grayish brown silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam.

Sable soils are on the broad flats. They are poorly drained. Typically, the surface layer is black, friable silty clay loam about 6 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is dark grayish brown and gray, mottled, friable and firm silty clay loam about 23 inches thick. The underlying material to a depth of 60 inches is light gray, mottled, calcareous, friable silt loam.

Minor in this association are the slowly permeable Denny and Edinburg soils in shallow depressions and the moderately well drained Tama soils along drainageways and on convex ridgetops.

This association is used mainly for cultivated crops or pasture. In the Galesburg area, however, the soils also are used as sites for dwellings, septic tank absorption fields, and local roads and streets.

The soils in this association are well suited to cultivated crops. The seasonal high water table has been effectively lowered in most areas. Measures that maintain the drainage system are the major management concerns.

The major soils in this association are poorly suited to dwellings and to local roads and streets. The Ipava soils are poorly suited to septic tank absorption fields, and the Sable soils are generally unsuited because of ponding. The seasonal high water table and moderately slow permeability are the main limitations on sites for dwellings or for septic tank absorption fields.

2. Tama-Ipava Association

Strongly sloping to nearly level, moderately well drained and somewhat poorly drained soils formed in loess on uplands

This association consists of soils on ridges and knolls and in nearly level areas between the ridges. Most of the association is drained by narrow drainageways and by

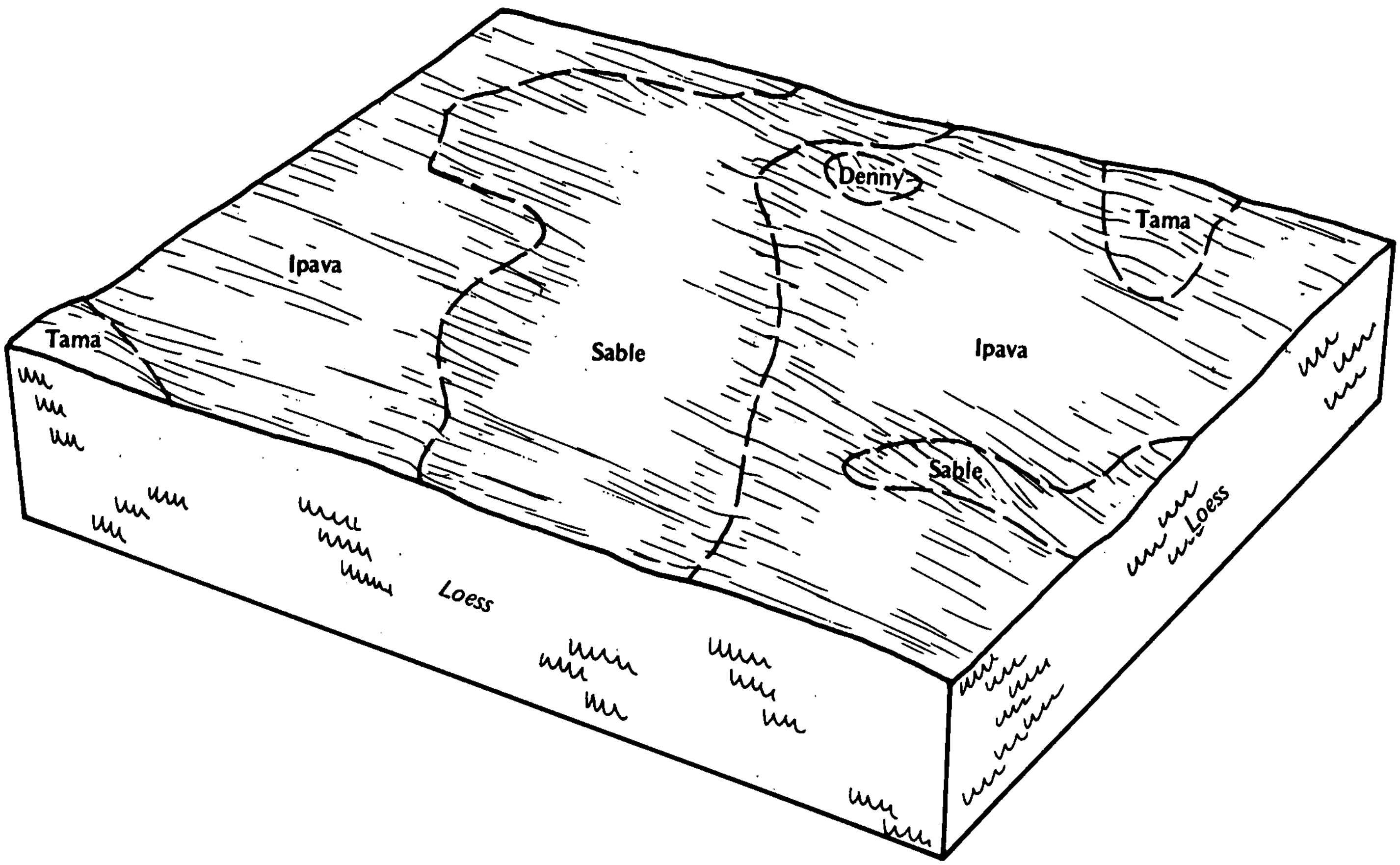


Figure 1.—Typical pattern of soils and parent material in the Ipava-Sable association.

many small, meandering streams. Slopes are generally long and smooth; however, they are more irregular along drainageways. They range from 0 to 15 percent.

This association makes up 43 percent of the county. It is about 55 percent Tama soils, 25 percent of Ipava soils, and 20 percent minor soils (fig. 2).

Tama soils are gently sloping to strongly sloping and are on ridges, knolls, and side slopes along the drainageways. They are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is friable silty clay loam about 34 inches thick. The upper part is brown and dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam.

Ipava soils are nearly level and are between the ridges and knolls. They are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is mottled and friable. The upper part is brown silty clay loam, the next part is dark grayish brown silty clay, and the lower part is grayish brown silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam.

Minor in this association are the Assumption, Coatsburg, Denny, Elkhart, Hickory, and Sable soils. Assumption soils and the well drained Hickory soils are on the steeper slopes along the drainageways. Assumption soils are moderately slowly permeable in the lower part of the subsoil. The poorly drained Coatsburg soils are on the lower side slopes along the drainageways. The poorly drained Denny soils are in shallow depressions. The well drained Elkhart soils are at the head of the drainageways. The poorly drained Sable soils are on the broader flats.

This association is used mainly for cultivated crops or for pasture and hay. In the Galesburg area, however, the soils also are used as sites for dwellings, septic tank absorption fields, or local roads and streets.

The nearly level and gently sloping soils in this association generally are well suited to cultivated crops,

pasture, and hay. The more sloping soils are moderately suited to cultivated crops. Erosion is the major hazard.

The nearly level soils in this association are poorly suited to dwellings and septic tank absorption fields. The gently sloping to strongly sloping soils are moderately suited. The seasonal high water table, moderately slow permeability, and the shrink-swell potential are the major limitations in the nearly level areas. The slope is a limitation in the more sloping areas.

3. Rozetta-Clarksdale-Elco Association

Nearly level to steep, moderately well drained and somewhat poorly drained soils formed in loess and in loess and glacial till; on uplands

This association consists of soils on incised uplands. Most areas are drained by narrow drainageways. Nearly level to sloping areas are between the drainageways. Slopes are generally short and smooth. They range from 0 to 20 percent.

This association makes up 24 percent of the county. It is about 55 percent Rozetta and similar soils, 15 percent Clarksdale and similar soils, 10 percent Elco soils, and 20 percent minor soils (fig. 3).

Rozetta soils are gently sloping and sloping. They are in the higher areas between drainageways or are on the upper parts of side slopes along the drainageways. They are moderately well drained. Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is silty clay loam about 44 inches thick. It is mottled below a depth of 28 inches. The upper part is dark yellowish brown and friable, the next part is yellowish brown and dark yellowish brown and is firm, and the lower part is yellowish brown and friable. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray, friable silt loam.

Clarksdale soils are nearly level and are in areas between the drainageways. They are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 3 inches thick. The subsoil is about 32 inches thick. The upper part is brown, mottled, firm silty clay loam; the next part is brown, mottled, firm silty clay; and the lower part is grayish brown, mottled, friable silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam.

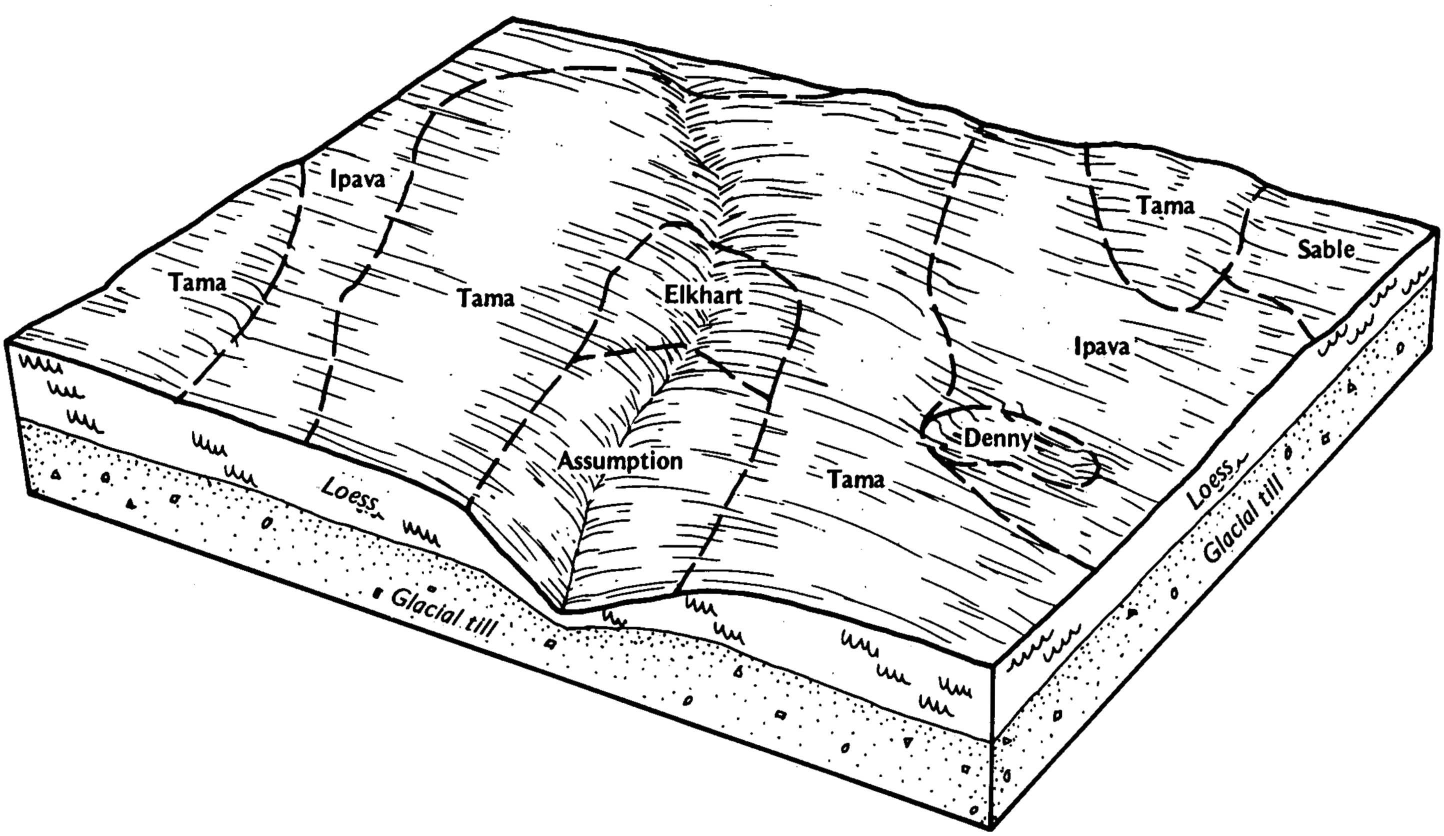


Figure 2.—Typical pattern of soils and parent material in the Tama-Ipava association.

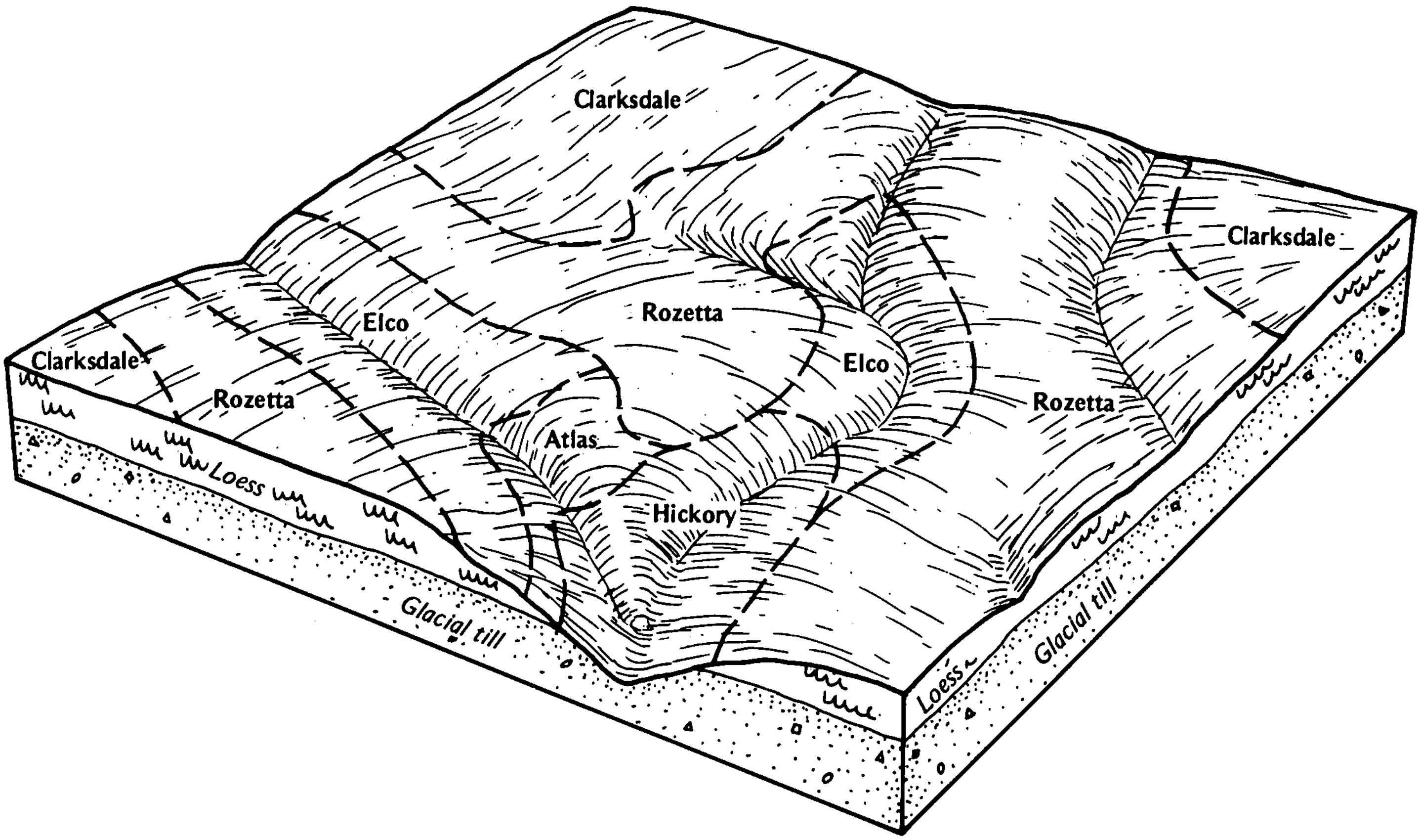


Figure 3.—Typical pattern of soils and parent material in the Rozetta-Clarksdale-Elco association.

Elco soils are strongly sloping and steep and are on the middle and lower side slopes along drainageways. They are moderately well drained. Typically, the surface layer is mixed very dark grayish brown and grayish brown, friable silt loam about 2 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 53 inches thick. The upper part is dark yellowish brown, friable silty clay loam, and the lower part is olive brown and grayish brown, mottled, firm clay loam.

Minor in this association are the very slowly permeable Atlas soils on the lower side slopes along drainageways and the well drained Hickory soils on side slopes and at the head of drainageways.

This association is used mainly for cultivated crops or for pasture and hay. The nearly level and gently sloping soils generally are well suited to these uses, and the more sloping soils are moderately suited. Erosion is the major hazard.

The gently sloping to strongly sloping soils in this association are moderately suited to dwellings. The seasonal high water table and the shrink-swell potential are the major limitations. The nearly level and strongly sloping soils are poorly suited to septic tank absorption fields, and the gently sloping and sloping soils are moderately suited. The seasonal high water table and moderate permeability are the major limitations on sites for septic tank absorption fields.

Openland wildlife is abundant in areas where habitat is available. Woodland wildlife is abundant in the wooded areas along drainageways.

4. Hickory-Marseilles Association

Strongly sloping to very steep, well drained soils formed in glacial till and in material weathered from shale and siltstone; on uplands

This association consists of soils on side slopes along incised drainageways. Slopes are generally short and smooth. They range from 15 to 60 percent.

This association makes up 12 percent of the county. It is about 50 percent Hickory soils, 20 percent of Marseilles soils, and 30 percent minor soils (fig. 4).

Hickory soils are strongly sloping to very steep and are on side slopes. Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The

subsurface layer is dark grayish brown, friable loam about 5 inches thick. The subsoil is about 38 inches thick. The upper part is brown, friable loam; the next part is dark yellowish brown, mottled, firm clay loam; and the lower part is yellowish brown, mottled, friable clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, calcareous, friable loam.

Marseilles soils are steep and very steep and are on the lower side slopes. Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is silty clay loam about 28 inches thick. The upper part is yellowish brown and friable, the next part is yellowish brown and firm, and the lower part is olive, mottled, and very firm. Olive and light brownish gray, mottled, extremely firm shale and siltstone bedrock is at a depth of about 34 inches.

Minor in this association are the Alvin, Atlas, Camden, Elco, Lawson, Orion, and Rozetta soils. The well drained Alvin and moderately well drained Camden soils are on side slopes near the major streams. The somewhat poorly drained Atlas soils are on side slopes above the Hickory soils. The moderately well drained Elco soils on side slopes above the Hickory and Marseilles soils. The somewhat poorly drained Lawson and Orion soils in drainageways. The moderately well drained Rozetta soils are on narrow ridgetops.

Most areas are used for woodland or for woodland wildlife habitat. Some of the less sloping areas are pastured. This association is moderately suited to pasture and woodland. Erosion is the major hazard in the pastured areas. Erosion and the slope are the major concerns in managing woodland. Woodland wildlife is abundant in areas where habitat is available.

This association is generally unsuited to dwellings and sanitary facilities because of the slope of both of the major soils and the depth to bedrock in the Marseilles soils.

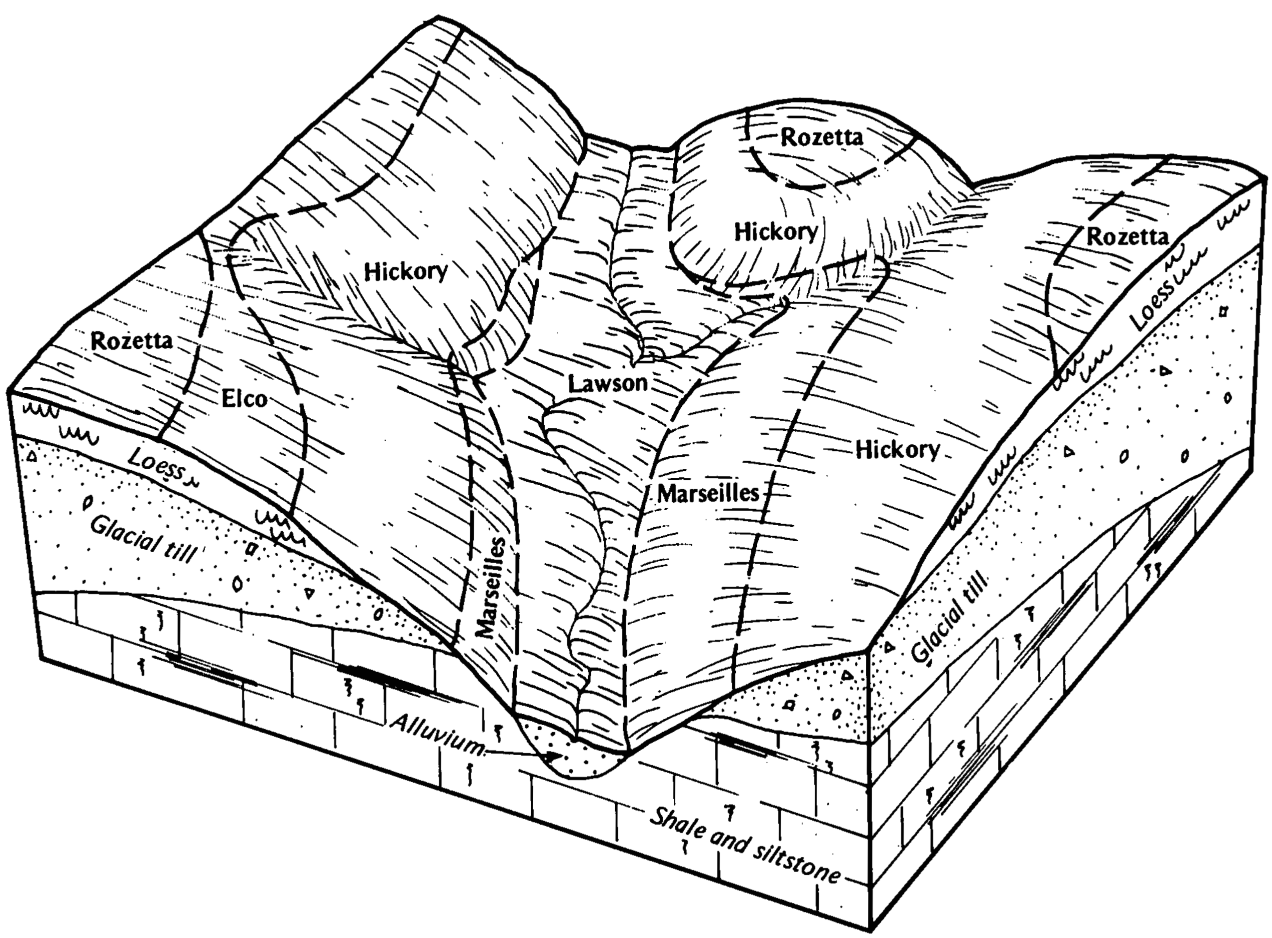


Figure 4.—Typical pattern of soils and parent material in the Hickory-Marseilles association.

5. Lawson-Sawmill-Huntsville Association

Nearly level, somewhat poorly drained, poorly drained, and well drained soils formed in alluvium on bottom land

This association consists of nearly level soils on bottom land along the Spoon River and the other major streams. These soils are frequently or occasionally flooded for brief periods. Slopes range from 0 to 2 percent.

This association makes up 7 percent of the county. It is about 45 percent Lawson soils, 20 percent Sawmill and similar soils, 15 percent Huntsville soils, and 20 percent minor soils (fig. 5).

Lawson soils are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 12 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 19 inches thick. The underlying material to a depth of 60 inches is stratified dark grayish brown, brown, and very dark grayish brown, mottled, friable silt loam. It contains iron concretions.

Sawmill soils are poorly drained. Typically, the surface layer is very dark gray, firm silty clay loam about 13 inches thick. The subsurface layer is very dark gray and black, firm silty clay loam about 25 inches thick. It is mottled in the lower part. The subsoil is dark gray, mottled, firm and friable silty clay loam about 16 inches thick. The underlying material to a depth of 60 inches is gray, mottled, friable silty clay loam.

Huntsville soils are well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is friable silt loam about 42 inches thick. The upper part is very dark grayish brown, the next part is dark brown, and the lower part is brown. The underlying material to a depth of 60 inches is dark brown, friable silt loam.

Minor in this association are the Alvin, Camden, Dorchester, Downs, Harvard, Littleton, and Orion soils. The well drained Alvin and Harvard, moderately well drained Camden and Downs, and somewhat poorly drained Littleton soils are on terraces. The well drained, calcareous Dorchester and somewhat poorly drained Orion soils are on bottom land. Their surface layer is lighter colored than that of the major soils.

This association is used mainly for cultivated crops or for pasture and hay. It is generally well suited to these uses. The flooding delays harvesting of hay and row crops in some years. These soils are generally unsuited to dwellings and septic tank absorption fields because of

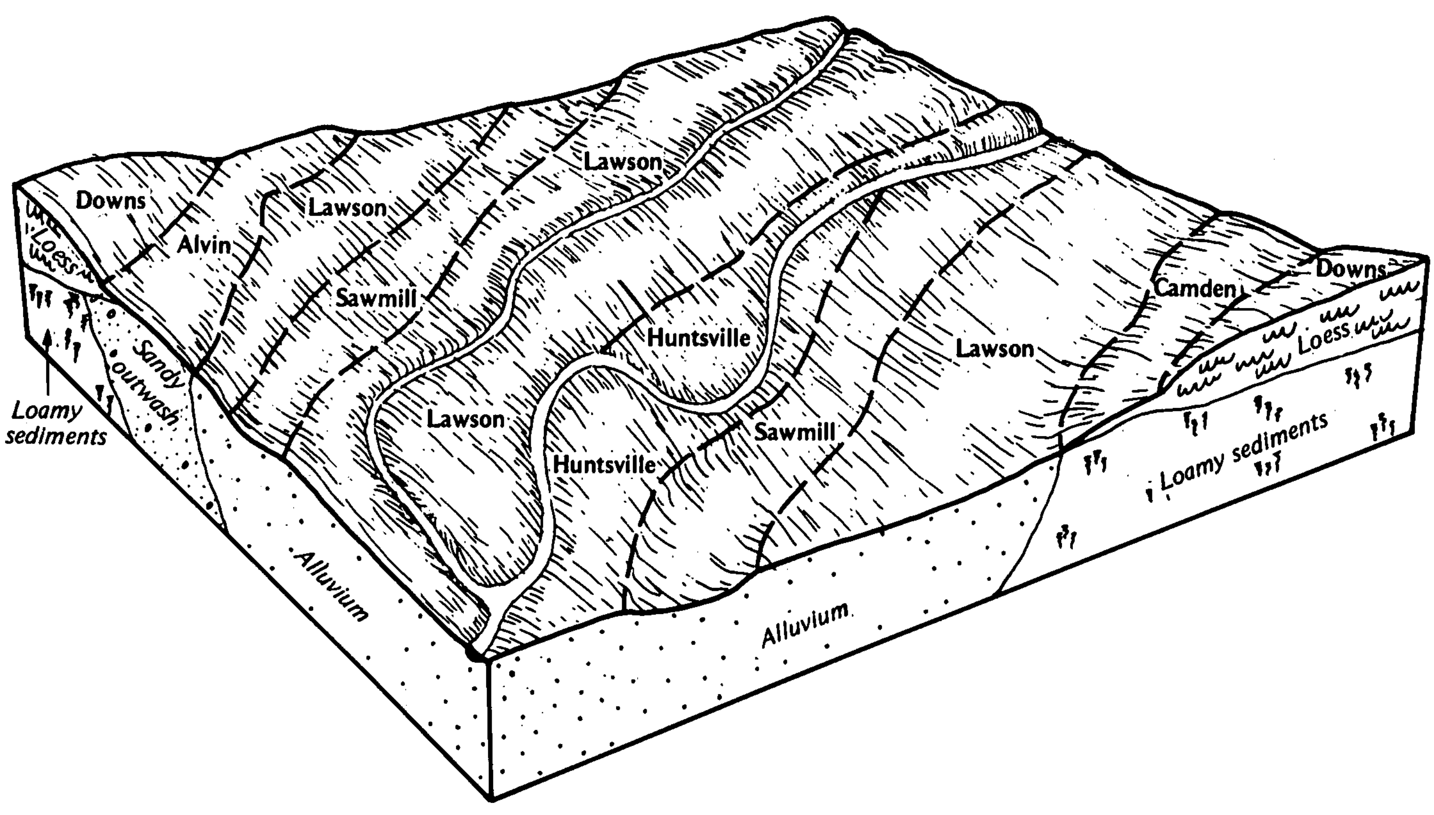


Figure 5.—Typical pattern of soils and parent material in the Lawson-Sawmill-Huntsville association.

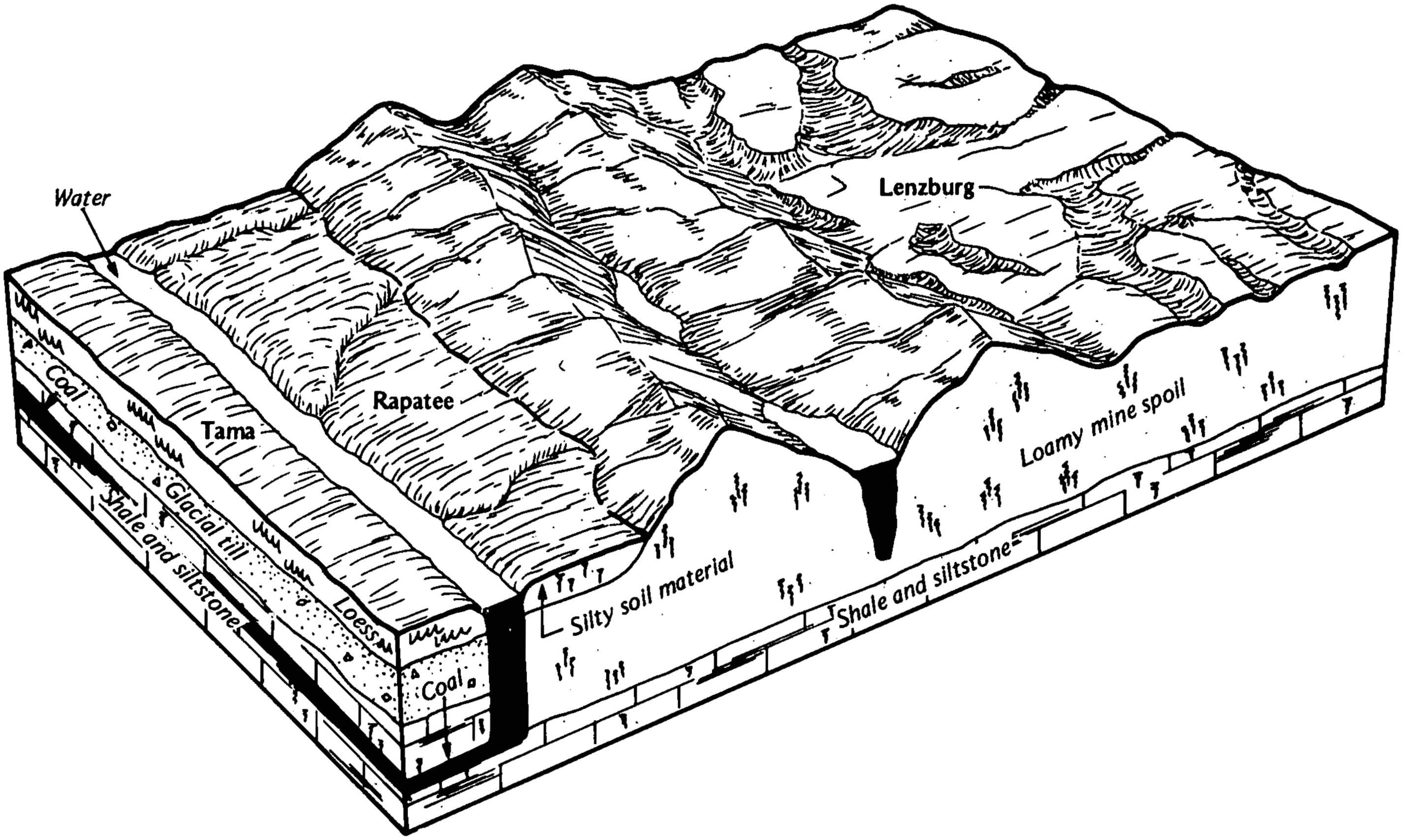


Figure 6.—Typical pattern of soils and parent material in the Lenzburg-Rapatee association.

the flooding. An abundance of openland wildlife and some wetland wildlife are in areas where habitat is available.

6. Lenzburg-Rapatee Association

Gently sloping to very steep, well drained soils formed in loamy mine spoil or in silty soil material underlain by mine spoil; on uplands

This association consists of soils on high parallel ridges, in swales, and on gently sloping to strongly sloping plains and ridges. Very little reclamation has taken place on the high ridges and in the swales. Reclamation has been more intensive on the gently sloping to strongly sloping ridges and plains. Numerous water areas 2 to 80 acres in size are throughout the association. Slopes range from 1 to 70 percent.

This association makes up about 5 percent of the county. It is about 80 percent Lenzburg soils, 5 percent Rapatee soils, and 15 percent minor soils (fig. 6).

Lenzburg soils are gently sloping to very steep. They are in old mine spoil areas that have not been reclaimed at all or have been reclaimed only by some grading and leveling. Typically, the surface layer is dark grayish brown, calcareous, friable silty clay loam about 2 inches thick. The upper part of the underlying material is mixed grayish brown and yellowish brown, calcareous, friable silty clay loam about 15 inches thick. The lower part to a depth of 60 inches is mixed brown and yellowish brown, mottled, calcareous, friable channery loam.

Rapatee soils are gently sloping. They are in the more recent mine spoil areas where replacement of soil material and extensive grading and leveling have taken place. Typically, the surface layer is mixed black and very dark gray, friable silty clay loam about 3 inches thick. The upper part of the underlying material is mixed black and very dark gray, very firm silty clay loam about 15 inches thick. The next part is mixed dark yellowish brown and yellowish brown, very firm silty clay loam about 22 inches thick. The lower part to a depth of 60 inches is mixed brown, yellowish brown, and greenish gray, calcareous, very firm clay loam.

Minor in this association are the somewhat poorly drained Atlas, moderately well drained Elco, and well drained Hickory and Marseilles soils. All of these minor

soils are along drainageways in areas that were not mined. Also of minor extent are many soils that formed in loess in unmined areas adjacent to the final cut or highwall. Tama soils are an example.

This association is used mainly for pasture. Some areas are idle land or have been developed for recreation uses, including hunting, fishing, camping, hiking, and boating. Some of the steeper areas are wooded. The nearly level and gently sloping areas are used for hay, small grain, or row crops.

This association is moderately suited to pasture and hay where seeding and mowing are possible. Erosion, a low available water capacity, and the short, irregular slopes are the major management concerns.

The nearly level and gently sloping areas that are being reclaimed more extensively are well suited to cultivated crops. Erosion, water management, and a restricted root zone are the major management concerns.

This association is suited to hiking areas on all but the steepest slopes and to camping areas on the more gentle slopes. Erosion is the major hazard. An abundance of openland wildlife and some wetland wildlife are in areas where habitat is available.

The gently sloping soils in this association are moderately suited to dwellings. They are poorly suited or moderately suited to septic tank absorption fields. The shrink-swell potential is the major limitation on sites for dwellings. Moderately slow or very slow permeability is a limitation on sites for septic tank absorption fields.

Broad Land Use Considerations

The soils in Knox County vary greatly in their suitability for major land uses. In 1978, about 59 percent of the county was used for cultivated crops, principally corn and soybeans, 18 percent was used for pasture and hay, and 6 percent was woodland (*12*). About 5 percent is surface-mined areas. The rest of the county is used for other purposes, including urban and recreational development and wildlife habitat.

The cropland is in scattered areas throughout the county, mainly in associations 1, 2, 3, and 5. The major limitation in association 1 is wetness, and the major hazard in associations 2 and 3 is erosion. Most areas in association 5 are occasionally or frequently flooded, principally in early spring. The flooding can delay fieldwork or cause slight or moderate crop damage. Associations 1 to 5 are generally suitable for grasses and legumes for pasture and hay.

Most of the woodland in the county is in associations 3, 4, and 6. The soils in these associations generally are very well suited or well suited to woodland. The very steep soils, however, are only moderately well suited. Erosion is the major hazard.

All of the surface-mined areas in the county are in association 6. The properties of the soils in this association vary, depending on the degree of reclamation. Erosion is the major hazard. The moderately slow or very slow permeability, compaction, and water management are problems.

In general, the gently sloping and sloping Tama, Elkhart, Rozetta, Fayette, and Sylvan soils are the best suited soils in the county for urban uses. These soils are most extensive in associations 2 and 3. In the other associations, a high shrink-swell potential, slow permeability, a seasonal high water table, and steep slopes are the major limitations. Soils on flood plains, such as those in association 5, are generally unsuitable as sites for dwellings, septic tank absorption fields, parks, and local roads because of the flooding hazard.

The suitability of the soils for recreational development varies widely, depending on the intensity of use and the soil properties. The soils that are best suited to camp and picnic areas are gently sloping or sloping. Examples are some of the soils in association 2 and 3 (fig. 7). Soils that are wet or are subject to flooding, such as those in associations 1 and 5, generally are poorly suited to most intensive recreational uses. The slope limits the development of associations 4 and 6 for many recreational uses. All of the soils in these associations, except for the very steep ones, are suitable for hiking or horseback riding trails. Small areas that are suitable for intensive recreational development generally are available in all of the associations.

The suitability for wildlife habitat is good throughout the county. All of the associations are well suited to openland wildlife habitat. The soils best suited to woodland wildlife habitat are in associations 4 and 6. Some soils in associations 5 and 6 are moderately suited to certain types of wetland wildlife habitat.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of

Figure 7.—An area of Rozetta soils used for picnicking.

a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Tama silty clay loam, 5 to 10 percent slopes, eroded, is one of several phases in the Tama series.

Some map units are made up of two or more major soils or one or more major soils and a miscellaneous area. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Ipava-Urban land-Tama complex, 1 to 5 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such

differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Dumps, mine, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

In some areas the detailed soil maps of Knox County do not join with those of Henry County. Differences result from refinements in series concepts, variations in the extent of individual soils, and the application of the latest soil classification system. The soils in these map units have similar properties and similar potentials for major land uses. Differences in the map unit names do not significantly affect the use and behavior of the soils.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

7D3—Atlas silty clay loam, 10 to 18 percent slopes, severely eroded. This strongly sloping, somewhat poorly drained soil is on upland side slopes and foot slopes. Individual areas are long and narrow and range from 3 to 60 acres in size.

Typically, the surface layer is mixed brown and yellowish brown, friable silty clay loam about 6 inches thick. The subsoil is about 54 inches thick. The upper part is yellowish brown, mottled, friable silty clay loam. The next part is dark gray, mottled, very firm silty clay loam. The lower part is dark grayish brown, grayish brown, and gray, mottled, very firm silty clay. In some areas the surface layer is darker and thicker. In other areas the slope is less than 7 percent.

Included with this soil in mapping are small areas of the moderately well drained Elco soils and the well drained Hickory soils. Elco soils formed in a mantle of silty loess that is thicker than that of the Atlas soil and are deeper to a firm subsoil layer high in content of clay. They are in the higher positions on the side slopes. Hickory soils have less clay in the subsoil than the Atlas soil. They are in the lower positions on the side slopes. Included soils make up 5 to 10 percent of the unit.

Air and water move through the Atlas soil at a very slow rate. Surface runoff is rapid in cultivated areas. A perched seasonal high water table is within 2 feet of the surface during the spring. Available water capacity is moderate. Organic matter content is low. The surface layer is strongly acid unless it is limed. The subsoil is medium acid. Root development is restricted by the very firm, clayey part of the subsoil below a depth of about 11 inches. Erosion has removed most of the original surface layer, and the plow layer is mostly subsoil material, which tends to puddle and crust after rains. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to openland wildlife habitat. It is poorly suited to pasture and hay and unsuited to cultivated crops because of the slope and a severe erosion hazard. It is moderately suited to woodland and poorly suited to dwellings and to septic tank absorption fields.

Establishing pasture or hay crops helps to keep erosion within tolerable limits. Establishing a forage crop is difficult, however, on severely eroded slopes where the subsoil is exposed. A no-till method of seeding and contour seeding help to control further erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as woodland, seedling mortality and windthrow are management concerns. The seedling mortality rate can be reduced by planting species that can withstand the moderate available water capacity, which results from the high content of clay in the subsoil. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

Wild herbaceous plants, grain and seed crops, grasses, such as bromegrass and orchardgrass, and legumes, such as ladino clover, alsike clover, and red clover, can provide food and cover for openland wildlife. Measures that protect the habitat from grazing are needed.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential of the subsoil are limitations. Installing subsurface tile drains near the foundation, extending the footings below the subsoil, and reinforcing the foundation help to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water and reduces the wetness. Specially designed systems that include sand filters are necessary to overcome the very slow permeability.

The land capability classification is VIe.

8D2—Hickory silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on

upland side slopes and foot slopes. Individual areas are irregularly shaped or long and narrow and range from 4 to 95 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 34 inches thick. It is mottled below a depth of 21 inches. The upper part is dark yellowish brown, friable silt loam; the next part is yellowish brown and brown, firm clay loam; and the lower part is brown, friable loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable loam. In some areas the surface layer is darker and thicker. In other areas the slope is 8 to 10 or 15 to 20 percent. In places the surface layer is clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas soils. These soils have more clay in the subsoil than the Hickory soil. Also, they are higher on the landscape. They make up 5 to 10 percent of the unit.

Air and water move through the Hickory soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The surface layer and subsoil generally are strongly acid. Reaction varies in the surface layer, however, as a result of local liming practices. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, pasture and hay, dwellings, and septic tank absorption fields. It is very well suited to woodland.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil in used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting, filling, and land shaping help to overcome the slope. Extending foundation footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The moderate permeability and the slope are limitations if this soil is used as a site for septic tank absorption fields. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate permeability. Installing the distribution lines on the contour or cutting and land shaping help to overcome the slope.

The land capability classification is IIIe.

8E2—Hickory silt loam, 15 to 30 percent slopes, eroded. This steep, well drained soil is on upland side slopes and foot slopes. Individual areas are irregularly shaped or long and narrow and range from 3 to 205 acres in size.

Typically, the surface layer is brown, friable silt loam about 4 inches thick. The subsoil is about 45 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The lower part is yellowish brown, mottled, firm clay loam. The underlying material to a depth of 60 inches is brown, mottled, calcareous, firm clay loam. In some areas the surface layer is thicker and darker. In other areas the underlying material contains brown loamy sand.

Included with this soil in mapping are small areas of Atlas, Dorchester, and Marseilles soils. The somewhat poorly drained Atlas soils are on side slopes above the Hickory soils. The occasionally flooded Dorchester soils are in drainageways. Marseilles soils are moderately deep over shale and siltstone. They are in the lower areas on the side slopes. Included soils make up 8 to 12 percent of the unit.

Air and water move through the Hickory soil at a moderate rate. Surface runoff is rapid in pasture areas. Available water capacity is high. Organic matter content is moderately low. Reaction in the surface layer generally is medium acid but varies as a result of local liming practices. The subsoil is very strongly acid. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture and hay. This soil is very well suited to woodland and well suited to woodland wildlife habitat. It is moderately suited to pasture and hay. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion.

Application of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIe.

8G—Hickory loam, 30 to 50 percent slopes. This very steep, well drained soil is on upland side slopes and foot slopes. Individual areas are irregularly shaped or long and narrow and range from 4 to 90 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The subsurface layer is dark grayish brown, friable loam about 5 inches thick. The subsoil is about 38 inches thick. The upper part is brown, friable loam; the next part is dark yellowish brown, mottled, firm clay loam; and the lower part is yellowish brown, mottled, friable clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, calcareous, friable loam. In some areas the subsoil contains less clay and is calcareous within a depth of 20 inches. In other areas the surface layer is thicker and darker. In places the underlying material contains brown loamy sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson soils and the well drained Marseilles soils. Lawson soils formed in alluvium in drainageways. Marseilles soils formed dominantly in material weathered from shale and siltstone. They are on the lower side slopes. Included soils make up 5 to 10 percent of the unit.

Air and water move through the Hickory soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is high. Organic matter content is moderate. The surface layer is medium acid. The subsoil is strongly acid. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used as woodland and woodland wildlife habitat. This soil is very well suited to woodland and well suited to woodland wildlife habitat. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

Trees and shrubs can be easily established on this soil. The existing stands of trees provide good habitat for woodland wildlife. Protection from fire and grazing helps to prevent depletion of the shrubs and sprouts, which provide food for the wildlife.

The land capability classification is VIIe.

17—Keomah silt loam. This nearly level, somewhat poorly drained soil is on broad ridgetops and upland drainage divides. Individual areas are irregular in shape and range from 2 to 75 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 6 inches thick. The subsoil is mottled silty clay loam about 36 inches thick. The upper part is brown and dark yellowish brown and is friable, the next part is dark grayish brown and firm, and the lower part is grayish brown and friable. The underlying material to a depth of 60 inches is dark grayish brown, mottled, calcareous, friable silt loam. In some areas the surface layer is darker and thicker. In other areas the slope is more than 2 percent. In places the depth to the seasonal high water table is more than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Denny soils. These soils are in shallow depressions and are subject to ponding. They make up 2 to 10 percent of the unit.

Air and water move through the Keomah soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 2 to 4 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. Reaction in the surface layer is neutral because of local liming practices. The subsoil is strongly acid. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to dwellings and septic tank absorption fields.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and productivity.

Adapted forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations, extending footings below the subsoil, and reinforcing the foundations help to prevent the structural damage caused by wetness and by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains lower the water table. Grading and land shaping help to dispose of excess surface water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.

The land capability classification is IIw.

19C3—Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded. This sloping, well drained soil is on side slopes and at the head of drainageways. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is brown, friable silty clay loam about 4 inches thick. The subsoil is about 19 inches thick. It is brown, mottled, and friable. The upper part is silty clay loam, and the lower part is silt loam. The underlying material to a depth of 60 inches is grayish brown, mottled, calcareous, very friable silt loam. In places, the subsoil is thicker and the depth to free lime is greater.

Included with this soil in mapping are small areas of the moderately well drained Elco soils. These soils have a firm subsoil. They are on side slopes below the Sylvan soil. They make up 5 to 10 percent of the unit.

Air and water move through the Sylvan soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is very low. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. Erosion has removed all of the original surface layer, and the plow layer is mostly subsoil material, which puddles and crusts easily after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is poorly suited to cultivated crops and moderately suited to pasture and hay. It is well suited to woodland, to openland and woodland wildlife habitat, to dwellings, and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. Poor tilth is a limitation. A conservation tillage system that leaves crop residue on the surface after planting, a crop rotation that is dominated by forage crops, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material improve tilth and increase the rate of water intake.

Establishing pasture or hay crops helps to keep soil loss within tolerable limits. Establishing a forage crop is difficult, however, on severely eroded slopes where the subsoil is exposed. A no-till method of seeding and contour seeding help to control further erosion. The plants should not be clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IVe.

19D3—Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes and at the head of drainageways. Individual areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is brown, friable silty clay loam about 8 inches thick. The subsoil is friable silty clay loam about 19 inches thick. The upper part is yellowish brown, and the lower part is brown. The underlying material to a depth of 60 inches is mottled light brownish gray and yellowish brown, calcareous, friable silt loam. In places, the subsoil is thicker and the depth to free lime is greater. In some areas the subsoil and underlying material contain more sand and gravel.

Included with this soil in mapping are small areas of the moderately well drained Elco soils. These soils have

a very firm subsoil. They are on side slopes below the Sylvan soil. They make up 5 to 10 percent of the unit.

Air and water move through the Sylvan soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content is very low. The surface layer is medium acid unless it is limed. The subsoil also is medium acid. Erosion has removed all of the original surface layer, and the plow layer is mostly subsoil material, which puddles and crusts easily after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is poorly suited to cultivated crops and moderately suited to pasture and hay. It is well suited to woodland, to woodland and openland wildlife habitat, to dwellings, and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. Poor tilth is a limitation. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Adding organic material and returning crop residue to the soil help to prevent crusting and surface compaction and improve tilth. As a result, they increase the rate of water intake.

Establishing pasture and hay crops helps to keep soil loss within tolerable limits. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of seeding or pasture renovation helps in establishing forage species and in controlling erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation. On sites for dwellings without basements, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The slope is a limitation if this soil is used as a site for septic tank absorption fields. Installing the distribution lines on the contour or cutting and land shaping help to overcome this limitation.

The land capability classification is IVe.

36B—Tama silt loam, 1 to 4 percent slopes. This gently sloping, moderately well drained soil is predominantly on convex upland ridgetops. In a few areas, however, it is on stream terraces near the major drainageways. Individual areas are irregular in shape and range from 5 to more than 1,000 acres in size.

Typically, the surface layer is black, friable silt loam about 9 inches thick. The subsurface layer is very dark gray, friable silt loam about 4 inches thick. The subsoil is friable silty clay loam about 34 inches thick. The upper part is brown and dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is lighter colored and thinner. In some areas, the subsoil is thinner and free lime is within a depth of 40 inches. In other areas the depth to the seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Denny soils. These soils are in shallow depressions and are subject to ponding. They contain more clay in the subsoil than the Tama soil. Also included, on foot slopes in some areas along the major streams, are soils that are subject to rare flooding. Included soils make up 10 to 15 percent of the unit.

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations, extending the footings below the subsoil, and reinforcing the foundations helps to prevent the structural damage caused by wetness and by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

36B2—Tama silty clay loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is along upland drainageways. Individual areas are irregular in shape and range from 5 to 125 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 6 inches thick. The subsoil is silty clay loam about 38 inches thick. The upper part is brown and friable; the next part is dark yellowish brown and yellowish brown, mottled, and firm; and the lower part is yellowish brown, mottled, and friable. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is lighter colored. In some areas, the subsoil is thinner and free lime is within a depth of 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils have a surface layer that is thicker than that of the Tama soil. They are in the drainageways and are subject to flooding. They make up 5 to 10 percent of the unit.

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. Reaction in the surface layer is neutral because of local liming practices. The subsoil is slightly acid. The surface layer tends to crust after heavy rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard and tilth is a limitation. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Incorporation of crop residue into the soil or additions of organic material help to prevent crusting and improve tilth. A crop rotation that includes a deep-rooted legume improves tilth and helps to prevent surface compaction.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations, extending the footings below the subsoil, and reinforcing the foundations help to prevent the structural damage caused by wetness and by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

36C2—Tama silty clay loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on upland ridgetops and side slopes. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is friable silty clay loam about 34 inches thick. The upper part is brown and dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is lighter colored or thinner. In some areas, the subsoil is thinner and free lime is within a depth of 40 inches. In other areas a firm, clayey buried soil is within a depth of 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are in drainageways and are subject to flooding. They make up 2 to 10 percent of the unit.

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The surface layer tends to crust after heavy rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to pasture and hay. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard and tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation that includes 1 or more years of forage crops, by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants hay grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants

should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. Extending the footings below the subsoil and reinforcing the foundations help to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations lowers the water table.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIIe.

36D2—Tama silty clay loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is on upland side slopes. Individual areas are long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. It is mixed with some dark yellowish brown material. The subsoil is friable silty clay loam about 40 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is mottled light brownish gray and yellowish brown, friable silt loam. In places the surface layer is lighter colored. In some areas, the subsoil is thinner and free lime is within a depth of 40 inches. In other areas the subsoil and underlying material contain more sand and gravel.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are in drainageways and are subject to flooding. They make up 2 to 10 percent of the unit.

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The surface layer tends to crust after heavy rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, dwellings, and septic tank absorption fields. It is well suited to pasture and hay and to openland wildlife habitat.

Further erosion is a hazard if this soil is used for corn, soybeans, or small grain. Also, tilth is a limitation. Soil loss can be kept within tolerable limits by a crop rotation dominated by forage crops and by a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, prevent crusting, and improve tilth.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

The seasonal high water table, the slope, and the shrink-swell potential are limitations if this soil is used as a site for dwellings with basements. They can be overcome by installing subsurface tile drains near the foundation; by cutting, filling, and land shaping; and by extending the footings below the subsoil or reinforcing the foundations.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the slope are limitations. Subsurface tile drains lower the water table. Installing the distribution lines on the contour or cutting and land shaping help to overcome the slope.

The land capability classification is IIIe.

43A—Ipava silty loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is dominantly on broad upland plains and ridgetops. In a few areas, however, it is on stream terraces near the major drainageways. Individual areas are irregular in shape and range from 2 to 1,000 acres in size.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is mottled and friable. The upper part is brown silty clay loam, the next part is dark grayish brown silty clay, and the lower part is grayish brown silty clay loam. In some places, the surface layer is thinner and the subsurface layer is lighter in color. In other places the subsoil contains less clay. In some areas the slope is 4 percent. In other areas the depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Denny and Sable soils, which are subject to ponding. Denny soils are less permeable than the Ipava soil. They are in small, shallow, closed depressions. Sable soils are in drainageways and broad depressions. Also included, on foot slopes in some areas along the major streams, are soils that are subject to rare flooding. Included soils make up 10 to 15 percent of the unit.

Air and water move through the Ipava soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The surface layer is medium acid unless it is limed. The subsoil is

slightly acid. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, the wetness can delay planting in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available. Measures that maintain the drainage system are needed. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Grading and land shaping help to dispose of excess surface water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.

The land capability classification is I.

45—Denny silt loam. This nearly level, poorly drained soil is in closed depressions on broad upland plains. It is occasionally ponded for brief periods early in spring. Individual areas are round or oblong and range from 2 to 10 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, friable silt loam about 10 inches thick. The subsoil is about 33 inches thick. It is mottled and firm. The upper part is gray silty clay loam, the next part is gray silty clay, and the lower part is light brownish gray and light gray silty clay loam. The underlying material to a depth of 60 inches is light gray, mottled, friable silt loam. In places the soil has a thicker surface layer and has no subsurface layer. In some areas the surface layer is thinner and lighter colored.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarksdale and Keomah soils and the poorly drained Sable soils. Clarksdale and Keomah soils are higher on the landscape than the Denny soil and are not subject to ponding. Sable soils do not have a gray subsurface layer, have less clay in the subsoil than the Denny soil, and are more permeable. They are on the slightly higher parts of landscape. Included soils make up 3 to 8 percent of the unit.

Air and water move through the Denny soil at a slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content is moderate. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, openland wildlife habitat, and wetland wildlife habitat and is moderately suited to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

If this soil is used for pasture and hay, the ponding is a hazard. It can be controlled by surface drains, ditches, and surface inlet tile. Deferment of grazing when the soil is too wet helps to prevent surface compaction and deterioration of tilth. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

Wild herbaceous plants, grain and seed crops, grasses, such as bromegrass and orchardgrass, and legumes, such as ladino clover, alsike clover, and red clover, can provide food and cover for openland wildlife. Measures that protect the habitat from grazing are needed.

The land capability classification is IIw.

68—Sable silty clay loam. This nearly level, poorly drained soil is on broad upland flats and in depressions and shallow upland drainageways. It is occasionally ponded for brief periods early in spring. Individual areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is black, friable silty clay loam about 6 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is dark grayish brown and gray, mottled, friable and firm silty clay loam about 23 inches thick. The underlying material to a depth of 60 inches is light gray, mottled, calcareous, friable silt loam. In some areas the depth to a seasonal water table is more than 2 feet. In other areas, the surface layer and subsurface layer are thinner and the subsoil contains more clay.

Included with this soil in mapping are small areas of the moderately well drained Tama soils. These soils have a a surface soil that is thinner than that of the Sable soil. They are on the higher, more sloping parts of

the landscape. They make up 10 to 15 percent of the unit.

Air and water move through the Sable soil at a moderate rate. Surface runoff is slow or ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. Reaction is neutral in the surface soil and subsoil. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is poorly suited to dwellings and is generally unsuited to septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

If this soil is used as a site for dwellings, the ponding is a hazard. This hazard can be reduced by diverting surface water or constructing the building on raised fill material. Subsurface tile drains and surface inlet tile drains help to lower the water table.

The land capability classification is IIw.

74—Radford silt loam. This nearly level, somewhat poorly drained soil is on flood plains and the bottom of upland drainageways. It is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 3 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 9 inches thick. The subsurface layer and underlying material also are very dark gray, friable silt loam. The subsurface layer is about 11 inches thick. The underlying material is about 6 inches thick. It has thin strata of yellowish brown material. The lower part of the profile to a depth of 60 inches is a buried soil. It is black, friable and firm silty clay loam. In some places the underlying material is silt loam to a depth of more than 40 inches. In other places the surface soil is lighter colored.

Included with this soil in mapping are small areas of the well drained Huntsville and poorly drained Sawmill soils. Huntsville soils do not have a buried soil. They are on the higher parts of the landscape and are not subject to flooding. Sawmill soils contain more clay in the surface layer than the Radford soil. They generally are in the slightly lower positions on the wider parts of the flood plains. Included soils make up 5 to 15 percent of the unit.

Air and water move through the Radford soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The soil is slightly acid in the upper part and mildly alkaline in the lower part. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to openland wildlife habitat. It is moderately suited to wetland wildlife habitat and to pasture and hay. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the wetness is a limitation. Dikes or diversions can reduce the extent of the crop damage caused by floodwater in some years. Selecting crop varieties adapted to shorter growing seasons and wetter conditions also reduces extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used for forage or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIw.

77—Huntsville silt loam. This nearly level, well drained soil is on flood plains near streams. It is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 2 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is friable silt loam about 42 inches thick. The upper part is very dark grayish brown, the next part is dark brown, and the lower part is brown. The underlying material to a depth of 60 inches is dark brown, friable silt loam. In places the surface layer and subsurface layer are thinner. In some areas the soil contains more sand. In other areas the depth to the seasonal high water table is less than 6 feet.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion and poorly drained Sawmill soils. These soils are in the slightly lower landscape positions farther away from the streams. They make up 5 to 10 percent of the unit.

Air and water move through the Huntsville soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is very high. Organic matter

content is moderate. Reaction in the surface layer generally is slightly acid but varies because of local liming practices. Reaction in the subsurface layer is neutral. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops and to openland wildlife habitat. It is moderately suited to pasture and hay. It is very well suited to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard. Dikes or diversions can reduce the extent of the crop damage caused by floodwater in some areas. Selecting crop varieties adapted to shorter growing seasons and wetter conditions also reduces the extent of this damage. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used for pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIw.

81B—Littleton silt loam, 1 to 3 percent slopes. This gently sloping, somewhat poorly drained soil is on stream terraces. Individual areas are long and narrow and range from 3 to 50 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 6 inches thick. The subsurface layer is very dark gray and very dark grayish brown, friable silt loam about 26 inches thick. The underlying material to a depth of 60 inches is brown, mottled, friable silt loam. In places the surface layer and subsurface layer are thinner.

Included with this soil in mapping are small areas of the poorly drained Sawmill soils, which are subject to flooding. These soils contain more clay in the surface soil and subsoil than the Littleton soil. They make up 10 to 15 percent of the unit.

Air and water move through the Littleton soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. Reaction is neutral in the surface soil. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is poorly suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard, particularly near drainageways. Also, the wetness is a limitation. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain productivity and tilth and helps to control erosion. A drainage system helps to dry out the soil in the spring. Subsurface tile drains function satisfactorily if suitable outlets are available.

Adapted forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundation helps to overcome this limitation.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Grading and land shaping help to remove excess surface water.

The land capability classification is IIe.

104—Virgil silt loam. This nearly level, somewhat poorly drained soil is on stream terraces. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 42 inches thick. The upper part is brown, mottled, friable silt loam; the next part is brown, mottled, firm silty clay loam; and the lower part is dark yellowish brown, mottled, friable silt loam and loam. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, stratified silt loam, loam, and clay loam. In places the surface layer is thicker. In some areas the soil is shallower to stratified silt loam, loam, and clay loam.

Included with this soil in mapping are small areas of the well drained Harvard soils. These soils are in the slightly higher positions on the landscape. They make up 2 to 10 percent of the unit.

Air and water move through the Virgil soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Some areas may dry out slowly in the spring. As a result, a drainage system may be needed if crops are planted early in the year. Subsurface

tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and productivity.

Adapted forage and hay plants grow well on this soil. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing subsurface tile drains near the foundation helps to overcome this limitation.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Grading and land shaping help to remove excess surface water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate permeability.

The land capability classification is I.

107+—Sawmill silty clay loam, overwash. This nearly level, poorly drained soil is on flood plains and in small upland drainageways. It is frequently flooded for brief periods from March through May. Individual areas are long and narrow and range from 2 to 140 acres in size.

Typically, the surface layer is very dark gray, firm silty clay loam about 13 inches thick. The subsurface layer is very dark gray and black, firm silty clay loam about 25 inches thick. It is mottled in the lower part. The subsoil is dark gray, mottled, firm and friable silty clay loam about 16 inches thick. The underlying material to a depth of 60 inches is gray, mottled, friable silty clay loam. In some areas the surface layer is browner. In other areas it has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Littleton soils. These soils have less clay throughout the surface soil and subsoil than the Sawmill soil. They are in the higher landscape positions and are not subject to flooding. They make up 10 to 15 percent of the unit.

Air and water move through the Sawmill soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet during the spring. Available water capacity is very high. Organic matter content is high. The surface layer is mildly alkaline, and the subsurface layer is neutral. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, to woodland, and to openland wildlife habitat. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the wetness is a limitation. Flooding occurs less often than once every 2 years during the growing season. The soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Subsurface tile drains function satisfactorily if suitable outlets are available. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. A conservation tillage system that leaves crop residue on the surface after planting improves tilth, helps to prevent surface compaction and crusting, and increases the rate of water intake.

If this soil is used as woodland, the equipment limitation, seedling mortality, and windthrow are management concerns. They are caused by the wetness. Plant competition also is a concern. It affects the seedlings of desirable species. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand excessive wetness. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The grain and seed crops, grasses, and wild herbaceous plants used as food and cover by openland wildlife grow well on this soil. Measures that protect the habitat from grazing are needed. Some low areas in old oxbows and depressions are wet. Wetland plants and shallow water areas, which enhance wetland wildlife habitat, can be easily established in the oxbows and depressions.

The land capability classification is IIw.

119D2—Elco silt loam, 8 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is on shoulder slopes and side slopes in the uplands. Individual areas are long and narrow and range from 5 to 60 acres in size.

Typically, the surface layer is mixed very dark grayish brown and grayish brown, friable silt loam about 2 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 53 inches thick. The upper part is dark yellowish brown, friable silty clay loam, and the lower part is olive brown and grayish brown, mottled, firm clay loam. In places the

surface layer is darker and thicker. In some areas soil does not have a firm subsoil. In other areas the surface layer is silty clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas and Lawson soils. Atlas soils have a very firm subsoil within 20 inches of the surface and are very slowly permeable. They are on side slopes below the Elco soil. Lawson soils formed in alluvium, are subject to flooding, and are in drainageways. Included soils make up 5 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Elco soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 2.5 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is slightly acid because of local liming practices. The subsoil is strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to woodland and to woodland and openland wildlife habitat. It is moderately suited to cultivated crops, to pasture and hay, and to dwellings without basements. It is poorly suited to dwellings with basements and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth and productivity.

Adapted forage and hay crops grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus also helps to prevent surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings without basements, the seasonal high water table, the shrink-swell potential, and the slope are limitations. Installing subsurface tile drains near the foundations lowers the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting, filling, and land shaping help to overcome the slope.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.

The land capability classification is IIIe.

119E2—Elco silt loam, 15 to 20 percent slopes, eroded. This steep, moderately well drained soil is on shoulder slopes and side slopes in the uplands. Individual areas are long and narrow and range from 3 to 100 acres in size.

Typically, the surface layer is mixed dark grayish brown and yellowish brown silt loam about 4 inches thick. The subsoil is about 56 inches thick. The upper part is yellowish brown, friable silt loam; the next part is yellowish brown, firm silty clay loam; and the lower part is grayish brown and gray, mottled, firm clay loam. In places the surface layer is darker and thicker. In some areas the upper part of the subsoil is clay loam. In other areas the slope is as much as 25 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson soils. These soils formed in alluvium, are subject to flooding, and are in drainageways. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in Elco soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in pastured areas. The seasonal high water table is 2.5 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for pasture. This soil is well suited to woodland and to woodland wildlife habitat. It is moderately suited to pasture and hay. It is poorly suited to cultivated crops and is generally unsuited to dwellings and to septic tank absorption fields because of the slope.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing, surface compaction, excessive runoff, and a greater susceptibility to erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

If this soil is used as woodland, the erosion hazard, the equipment limitation, and seedling mortality are management concerns. Plant competition also is a

management concern. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand droughty conditions, by eliminating all competing vegetation near the seedlings, and by selecting the larger seedlings for planting. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

The land capability classification is IVe.

131B—Alvin sandy loam, 2 to 6 percent slopes. This gently sloping, well drained soil is on stream terraces along the major stream valleys. Individual areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is brown, friable sandy loam about 4 inches thick. The subsurface layer is brown, friable fine sandy loam about 6 inches thick. The subsoil is about 32 inches thick. The upper part is strong brown, friable sandy loam, and the lower part is strong brown, loose sandy loam that has loamy sand strata. The underlying material to a depth of 60 inches is yellowish brown, loose, stratified sandy loam and loamy sand. In some places the subsoil is thinner and contains less clay. In other places the underlying material contains more silt and less clay. In some areas the surface layer is darker and thicker. In other areas the slope is as much as 8 percent.

Included with this soil in mapping are small areas of a somewhat poorly drained, dark soil. This included soil is in small depressions and the more nearly level areas. It makes up 2 to 10 percent of the unit.

Air and water move through the Alvin soil at a moderately rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is moderate. Organic matter content is low. Reaction in the surface layer is neutral because of local liming practices. The subsoil is strongly acid. The potential for frost action moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture and hay, dwellings, septic tank absorption fields, and openland wildlife habitat.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. Also, the moderate available water capacity and the level of fertility are limitations. Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Field windbreaks and a tillage system that leaves the surface rough are effective in controlling soil blowing.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus a greater susceptibility to erosion and soil blowing. The plants should not be grazed until they are sufficiently established. Applications of fertilizer are needed.

The land capability classification is IIe.

131D—Alvin sandy loam, 8 to 15 percent slopes. This strongly sloping, well drained soil is on side slopes bordering the major stream valleys. Individual areas are long and narrow and range from 3 to 30 acres in size.

Typically, the surface layer is very dark gray, friable sandy loam about 5 inches thick. The subsurface layer is about 15 inches thick. It is dark grayish brown and yellowish brown, friable fine sandy loam and sandy loam. The subsoil is strong brown, friable sandy loam about 25 inches thick. It has pockets of loamy sand in the lower part. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable, stratified sandy loam, loamy sand, and sand. In places the underlying material contains less sand and more silt. In some areas the subsoil is thinner and contains less clay. In other areas the underlying material is glacial till.

Included with this soil in mapping are small areas of the moderately well drained Elco soils. These soils have more clay and less sand throughout the subsoil and underlying material than the Alvin soil and are moderately slowly permeable. They are in landscape positions similar to those of the Alvin soil. They make up 10 to 15 percent of the unit.

Air and water move through the Alvin soil at a moderately rapid rate. Surface runoff is medium in pastured areas. Available water capacity is moderate. Organic matter content is low. The surface layer is strongly acid unless it is limed. The subsoil also is strongly acid. The potential for frost action is moderate.

Most areas are used as pasture. This soil is well suited to woodland and to openland wildlife habitat. It is moderately suited to cultivated crops, pasture and hay, dwellings, and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion and soil blowing are hazards. Also, the moderate available water capacity and the level of fertility are limitations. Erosion can be controlled and moisture conserved by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these. Field windbreaks and a tillage system that leaves the surface rough are effective in controlling soil blowing.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent overgrazing and thus a greater susceptibility to erosion and soil blowing. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings or septic tank absorption fields, the slope is a limitation. Alteration of the slope by cutting, filling, and land shaping help to overcome this limitation on sites for dwellings. Installing the distribution lines on the contour helps to overcome the slope on sites for septic tank absorption fields.

The land capability classification is IIIe.

131E—Alvin sandy loam, 15 to 30 percent slopes. This steep, well drained soil is on side slopes bordering the major stream valleys. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 3 inches thick. The subsurface layer is brown, friable fine sandy loam about 6 inches thick. The subsoil is about 31 inches thick. The upper part is yellowish brown, friable sandy loam; the next part is strong brown, friable loam; and the lower part is strong brown, very friable sandy loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, very friable, stratified loam, sandy loam, and loamy sand. In places the underlying material contains more silt and less sand. In some areas the slope is more than 30 percent. In other areas the subsoil is thinner and contains less clay.

Included with this soil in mapping are small areas of the moderately well drained Elco soils. These soils have more clay and less sand throughout the subsoil and underlying material than the Alvin soil and are moderately slowly permeable. They are in landscape positions similar to those of the Alvin soil. They make up 10 to 15 percent of the unit.

Air and water move through the Alvin soil at a moderately rapid rate. Surface runoff is medium in wooded areas. Available water capacity is moderate. Organic matter content is low. The surface layer and subsoil are strongly acid. The potential for frost action is moderate.

Most areas are wooded. Some of the wooded areas are also used for pasture. This soil is well suited to woodland and to woodland wildlife habitat. It is moderately suited to pasture and hay. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

Establishing pasture plants helps to control erosion. Proper stocking rates, rotation grazing, and timely deferment of grazing help to prevent overgrazing, excessive runoff, and a greater susceptibility to erosion. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

The land capability classification is VIe.

134B—Camden silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on stream terraces. Individual areas are irregular in shape and range from 2 to 10 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is brown, friable silt loam about 3 inches thick. The subsoil is about 50 inches thick. The upper part is brown, firm silty clay loam, and the lower part is brown and yellowish brown, mottled, friable loam and sandy loam. In places the surface layer is darker. In some areas the slope is less than 2 percent. In other areas the depth to the seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of poorly drained soils. These soils have a silty layer that is thicker than that of the Camden soil. They are in nearly level areas or shallow depressions. They make up 2 to 10 percent of the unit.

Air and water move through the Camden soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is strongly acid unless it is limed. The subsoil is slightly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Adapted pasture and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderate permeability are limitations. Subsurface tile drains lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate permeability.

The land capability classification is IIe.

134C2—Camden silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on stream terraces and side slopes bordering stream valleys. Individual areas are irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 36 inches thick. It is mottled below a depth of 18 inches. The upper part is yellowish brown, friable and firm silty clay loam, and the lower part is yellowish brown, friable loam. The underlying material to a depth of 60 inches is brown and yellowish brown, mottled, friable sandy loam, loam, and silt loam. In places the surface layer contains more clay. In some areas the soil does not have loamy or sandy material in the lower part. In other areas the surface layer is thicker or darker.

Included with this soil in mapping are small areas of the somewhat poorly drained Virgil soils. These soils have a silty layer that is thicker than that of the Camden soil. They are in nearly level areas. They make up 2 to 8 percent of the unit.

Air and water move through the Camden soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is low. The surface layer is slightly acid because of local liming practices. The subsoil is strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, to dwellings, and to septic tank absorption fields. It is well suited to pasture and hay. It is very well suited to woodland.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted pasture and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates and timely deferment of grazing help to prevent overgrazing. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations lowers the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material help to overcome the moderate permeability.

The land capability classification is IIIe.

134D2—Camden silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, moderately well drained soil is on side slopes bordering stream valleys and on stream terraces. Individual areas are long and narrow and range from 2 to 35 acres in size.

Typically, the surface layer is mixed dark brown and brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 6 inches thick. The subsoil is about 33 inches thick. It is yellowish brown and friable. The upper part is silty clay loam, and the lower part is mottled clay loam. The underlying material to a depth of 60 inches is yellowish brown, mottled, firm loam. In places the lower part of the soil is silty. In some areas the slope is a much as 20

percent. In other areas the loamy material is closer to the surface.

Included with this soil in mapping are small areas of the moderately well drained Elco soils. These soils have more clay throughout the subsoil than the Camden soil. They are in landscape positions similar to those of the Camden soil. They make up 10 to 15 percent of the unit.

Air and water move through the Camden soil at a moderate rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is low. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is poorly suited to cultivated crops. It is well suited to pasture and hay and to woodland and openland wildlife habitat and is very well suited to woodland. It is moderately suited to dwellings with basements and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and productivity.

Adapted pasture and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates, rotation grazing, and timely deferment of grazing help to prevent overgrazing. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The slope and the shrink-swell potential also are limitations on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting, filling, and land shaping help to overcome the slope.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table, the moderate permeability, and the slope are limitations. Subsurface tile drains lower the water table. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderate permeability. Installing the distribution lines on the contour or cutting and filling help to overcome the slope.

The land capability classification is IVe.

239—Dorchester silt loam. This nearly level, well drained soil is on flood plains and in upland drainageways. It is occasionally flooded for brief periods from March through May. Individual areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface layer is very dark grayish brown, calcareous, friable silt loam about 6 inches thick. The underlying material to a depth of 60 inches is stratified very dark grayish brown and grayish brown, calcareous, friable silt loam that has very thin strata of coarser textured material. In places, the surface layer is thicker and the soil has no free lime.

Included with this soil in mapping are small areas of the poorly drained Sawmill soils. These soils contain more clay than the Dorchester soil. They are in the slightly lower landscape positions. They make up 10 to 15 percent of the unit.

Air and water move through the Dorchester soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is very high. Organic matter content is low. The surface layer is mildly alkaline, and the underlying material is moderately alkaline. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay and moderately suited to woodland and to openland wildlife habitat. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard. Dikes or diversions can reduce the extent of the crop damage caused by floodwater. Selecting crop varieties adapted to shorter growing seasons and wetter conditions also reduces the extent of this damage. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used for pasture, overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

If this soil is used as woodland, plant competition is a management concern. It affects the new seedlings of

desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

249—Edinburg silty clay loam. This nearly level, poorly drained soil is in closed depressions on broad upland plains. It is occasionally ponded for brief periods early in spring. Individual areas are round or oblong and range from 2 to 25 acres in size.

Typically, the surface layer is black, friable silty clay loam about 6 inches thick. The subsurface layer is very dark brown, friable silty clay loam about 10 inches thick. The subsoil is about 34 inches thick. The upper part is dark gray, mottled, friable silty clay; the next part is light gray, mottled, firm silty clay; and the lower part is light gray, mottled, firm silty clay loam. The underlying material to a depth of 60 inches is light gray, mottled, firm silty clay loam. In some areas, the surface layer is thinner and the subsurface layer is grayish brown silt loam.

Air and water move through the Edinburg soil at a slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content is moderate. Reaction is neutral in the surface layer and in the subsoil. The potential for frost action and the shrink-swell potential are high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. Unless drained, it also is well suited to wetland wildlife habitat. It is moderately suited to openland wildlife habitat. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Applying a conservation tillage system that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water intake.

If this soil is used for pasture and hay, the ponding is the main hazard. It can be controlled by subsurface drains and surface inlet tile. Deferment of grazing when the soil is too wet helps to prevent surface compaction and poor tilth. Proper stocking rates, pasture rotation, and applications of fertilizer help to keep the pasture in good condition.

This soil can be used for the grain and seed crops and grasses and legumes grown as food and cover for openland wildlife. Examples of suitable grasses and legumes are bromegrass, orchardgrass, ladino clover, alsike clover, and red clover. Measures that protect the habitat from grazing are needed.

The land capability classification is IIw.

257—Clarksdale silt loam. This nearly level, somewhat poorly drained soil is predominantly on broad upland ridgetops. In a few areas, however, it is on stream terraces near the major drainageways. Individual areas are irregular in shape and range from 2 to 400 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 3 inches thick. The subsoil is about 32 inches thick. The upper part is brown, mottled, firm silty clay loam; the next part is brown, mottled, firm silty clay; and the lower part is grayish brown, mottled, friable silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam. In places the surface layer is thinner and lighter colored. In some areas the surface layer and subsurface layer are darker and thicker. In other areas, the depth to the seasonal high water table is more than 3 feet and the slope is as much as 3 percent.

Included with this soil in mapping are small areas of the poorly drained Denny soils. These soils are in slight depressions and are subject to ponding. Also included, on foot slopes in some areas along the major streams, are soils that are subject to rare flooding. Included soils make up 5 to 10 percent of the unit.

Air and water move through the Clarksdale soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The surface layer is slightly acid because of local liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Subsurface tile drains can reduce the wetness if suitable outlets are available. Overgrazing or grazing when the soil is too wet reduces forage yields, causes surface compaction and excessive runoff, and increases the

susceptibility to erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations, extending the footings below the subsoil, and reinforcing the foundations help to prevent the structural damage caused by wetness and by shrinking and swelling

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow permeability.

The land capability classification is I.

259C2—Assumption silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on shoulder slopes and side slopes in the uplands. Individual areas are long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 51 inches thick. It is mottled throughout. The upper part is yellowish brown and brown, friable silty clay loam; the next part is grayish brown, firm silty clay loam; and the lower part is grayish brown and dark gray, firm clay loam. In places the surface layer is thinner and lighter colored. In some areas, the subsoil contains less sand and free lime is within a depth of 40 inches. In other areas the surface layer contains more sand.

Included with this soil in mapping are small areas of the poorly drained Coatsburg soils. These soils have a firm subsoil within 20 inches of the surface and are very slowly permeable. They are in landscape positions similar to those of the Assumption soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Assumption soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. Reaction in the surface layer is neutral because of local liming practices. The subsoil is slightly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to pasture and hay and is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates and timely deferment of grazing help to prevent overgrazing. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.

The land capability classification is IIIe.

259D2—Assumption silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, moderately well drained soil is on shoulder slopes and side slopes in the uplands. Individual areas are long and narrow and range from 7 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 54 inches thick. The upper part is brown, friable silt loam; the next part is brown and yellowish brown, friable silty clay loam; and the lower part is grayish brown, mottled, firm clay loam. In places the surface layer is thinner and lighter colored. In some areas, the subsoil contains less sand and free lime is within a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Coatsburg soils and the somewhat poorly drained Radford soils. Coatsburg soils have a firm subsoil within 20 inches of the surface and are very slowly permeable. They are in landscape positions similar to those of the Assumption soil. Radford soils formed in alluvium, are subject to flooding, and are in drainageways. Included soils make up 5 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in the Assumption soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay and to openland wildlife habitat. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and productivity.

Adapted forage and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates, rotation grazing, and timely deferment of grazing help to prevent overgrazing. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. The plants should not be grazed or clipped until they are sufficiently established. Applications of fertilizer help to keep the pasture in good condition and thus helps to control erosion.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The shrink-swell potential and the slope also are limitations on sites for dwellings without basements. Installing subsurface tile drains near the foundations helps to overcome the wetness. Cutting, filling, and land shaping help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.

The land capability classification is IIIe.

259D3—Assumption silty clay loam, 8 to 15 percent slopes, severely eroded. This strongly sloping, moderately well drained soil is on shoulder slopes and side slopes in the uplands. Individual areas are long and narrow and range from 3 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 55 inches thick. It is mottled below a depth of 20 inches. The upper part is brown and dark yellowish brown, firm silty clay loam, and the lower part is grayish brown, firm clay loam. In places the surface layer is thinner and lighter colored.

Included with this soil in mapping are small areas of the poorly drained Coatsburg soils. These soils have a firm subsoil within 20 inches of the surface and are very slowly permeable. They are in landscape positions similar to those of the Assumption soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the subsoil in the Assumption soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is rapid in cultivated areas. The seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The surface layer is slightly acid because of local liming practices. The subsoil is also slightly acid. The surface layer puddles and crusts easily after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and is well suited to openland wildlife habitat. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard and poor tilth is a limitation. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth, help to prevent surface crusting, and increase the rate of water intake.

Establishing pasture and hay crops helps to keep soil loss within tolerable limits. Seedbed preparation is difficult on side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps in establishing forage species and in controlling further erosion. The plants should not be grazed or clipped until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as a site for dwellings with basements, the seasonal high water table, the slope, and the shrink-swell potential are limitations. The shrink-swell potential and the slope also are limitations on sites for dwellings without basements. Installing subsurface

tile drains near the foundations helps to overcome the wetness. Cutting, filling, and land shaping help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderately slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains higher on the side slopes than the absorption field helps to intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste.

The land capability classification is IVe.

279B—Rozetta silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is predominantly on broad upland ridgetops and side slopes. In a few areas, however, it is on stream terraces near the major drainageways. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is silty clay loam about 44 inches thick. It is mottled below a depth of 28 inches. The upper part is dark yellowish brown and friable, the next part is yellowish brown and dark yellowish brown and is firm, and the lower part is yellowish brown and friable. The underlying material to a depth of 60 inches is mottled yellowish brown and light brownish gray, friable silt loam. In places the surface layer is darker and thicker. In some areas the depth to gray mottles is greater. In other areas the depth to the seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Denny soils. These soils have more clay in the subsoil than the Rozetta soil. They are in depressional areas. Also included, on foot slopes in some areas along the major streams, are soils that are subject to rare flooding. Included soils make up 10 to 15 percent of the unit.

Air and water move through the Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. Reaction in the surface layer is generally medium acid but varies because of local liming practices. The subsoil is strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture and hay, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table also is a limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations lowers the water table.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

The land capability classification is IIe.

279C2—Rozetta silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on upland side slopes. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 47 inches thick. It is mottled below a depth of 27 inches. The upper part is brown, friable silty clay loam; the next part is yellowish brown, firm silty clay loam; and the lower part is brown, friable silt loam. The underlying material to a depth of 60 inches is brown, friable silt loam. In some places the surface layer is darker and thicker. In other places the depth to gray mottles is greater. In some areas free lime is within a depth of 40 inches. In other areas a very firm paleosol is within a depth 40 inches. In places the slope is more than 10 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Clarksdale soils. These soils have more clay in the subsoil than the Rozetta soil. They are on nearly level drainage divides above the Rozetta soil. They make up 2 to 5 percent of the unit.

Air and water move through the Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. Reaction is neutral in the surface layer because of local liming practices. The subsoil is strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and is well suited to pasture and hay and to woodland. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates and timely deferment of grazing help to prevent overgrazing. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. The seasonal high water table also is a limitation on sites for dwellings with basements. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Installing subsurface tile drains near the foundations lowers the water table on sites for dwellings with basements.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the moderate permeability.

The land capability classification is IIIe.

280B—Fayette silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is predominantly on upland ridges and side slopes. In a few areas, however, it is on stream terraces near the major drainageways. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 49 inches thick. It is yellowish brown. In sequence downward, it is friable silt loam; firm silty clay loam; mottled, firm silty clay loam; and mottled, friable silty clay loam. In some places the surface layer is darker and thicker. In other places the middle part of the subsoil has more mottles. In some areas free lime is within a depth of 40 inches. In other areas the slope is less than 2 percent.

Included with this soil in mapping are small areas of the somewhat poorly drained Keomah soils. These soils have more clay in the subsoil than the Fayette soil. They are in nearly level areas. Also included, on foot slopes in some areas along the major streams, are soils that are subject to rare flooding. Included soils make up 10 to 15 percent of the unit.

Air and water move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The surface layer is slightly acid. The subsoil is very strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. Small isolated areas are used as woodland. This soil is well suited to cultivated crops, pasture and hay, woodland, and septic tank absorption fields. It is moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings

below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on upland side slopes. Individual areas are irregular in shape and range from 6 to 400 acres in size.

Typically, the surface layer is brown, friable silt loam about 10 inches thick. The subsoil is silty clay loam about 41 inches thick. The upper part is dark yellowish brown and firm, and the lower part is yellowish brown, mottled, and friable. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, friable silt loam. In places the surface layer is darker and thicker. In some areas the upper part of the subsoil is mottled. In other areas free lime is within a depth of 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained, nearly level Keomah soils near the head of drainageways. These soils have more clay in the subsoil than the Fayette soil. They make up 2 to 4 percent of the unit.

Air and water move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The surface layer is medium acid unless it has been limed. The subsoil also is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to septic tank absorption fields, pasture and hay, and woodland.

In areas used for corn, soybeans, or small grain, erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates and timely deferment of grazing help to prevent overgrazing. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Planting the pasture species on the contour helps to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

280D2—Fayette silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on upland side slopes. Individual areas are long and narrow and range from 2 to 40 acres in size.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsoil is about 35 inches thick. It is dark yellowish brown and yellowish brown. The upper part is firm silty clay loam, and the lower part is mottled, friable silt loam. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, friable silt loam. In places the upper part of the subsoil has gray mottles. In some areas free lime is within a depth of 40 inches. In other areas the subsoil formed in glacial till or in sandy loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion soils. These soils formed in alluvium, are subject to flooding, and are in drainageways and on toe slopes. They make up 3 to 8 percent of the unit.

Air and water move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is low. The surface layer is medium acid unless it is limed. The subsoil also is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and is well suited to pasture and hay, to woodland, and to openland wildlife habitat. It is moderately suited to camp and picnic areas, to dwellings, and to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and productivity.

Adapted forage and hay plants grow well on this soil. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates and timely deferment of grazing help to prevent overgrazing. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Tilling on the contour when a

seedbed is prepared or when the pasture is renovated helps to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting, filling, and land shaping help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The slope is a limitation if this soil is used as a site for septic tank absorption fields. Installing the distribution lines on the contour or cutting and land shaping help to overcome this limitation.

The land capability classification is IIIe.

280E—Fayette silt loam, 15 to 25 percent slopes. This steep, well drained soil is on upland side slopes bordering the major stream valleys. Individual areas are long and narrow and range from 2 to 30 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 3 inches thick. The subsurface layer is grayish brown, friable silt loam about 5 inches thick. The subsoil is about 28 inches thick. The upper part is dark yellowish brown, firm silty clay loam, and the lower part is yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches is dark yellowish brown, mottled, friable silt loam. In places the subsoil formed in glacial till or sandy loam. In some areas thin layers of loamy fine sand are in the underlying material.

Included with this soil in mapping are small areas of the somewhat poorly drained Orion soils. These soils formed in alluvium and are subject to flooding. They are in drainageways and on toe slopes. They make up 10 to 15 percent of the unit.

Air and water move through the Fayette soil at a moderate rate. Surface runoff is rapid in pastured areas. Available water capacity is high. Organic matter content is moderately low. The surface layer is slightly acid because of local liming practices. The subsoil is strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for pasture. This soil is well suited to pasture and hay, to woodland wildlife habitat, and to woodland. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

Establishing pasture and hay crops helps to control erosion. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates and timely deferment of grazing help to prevent overgrazing. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established. Tilling on the contour when a seedbed is prepared or the pasture is renovated help to keep the pasture in good condition and help to control erosion.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is VIe.

344B—Harvard silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 40 inches thick. The upper part is dark yellowish brown, friable silty clay loam; the next part is yellowish brown, friable silt loam; and the lower part is yellowish brown, friable clay loam. The underlying material to a depth of 60 inches is dark yellowish brown and yellowish brown, very friable, stratified loam, sandy loam, and loamy sand. In places the silty material in the upper part of the profile is thicker. In some areas the surface layer is thinner and lighter colored.

Included with this soil in mapping are small areas of the somewhat poorly drained Virgil soils. These soils have a mantle of silty material that is thicker than that of the Harvard soil. They are in the more nearly level or slightly depressional areas. They make up 5 to 10 percent of the unit.

Air and water move through the Harvard soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. Reaction is neutral in the surface layer because of local liming practices. The subsoil is slightly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The moderate permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

386B—Downs silt loam, 2 to 6 percent slopes. This gently sloping, moderately well drained soil is predominantly on ridgetops and the upper side slopes. In a few areas, however, it is on stream terraces near the major drainageways. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is silty clay loam about 52 inches thick. The upper part is brown and dark yellowish brown and is friable; the next part is dark yellowish brown, mottled, and firm; and the lower part is dark yellowish brown, mottled, and friable. In some places the surface layer is thinner and lighter colored. In other places it is thicker and darker. In some areas the depth to the seasonal high water table is less than 4 feet. In other areas the slope is more than 6 or less than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Denny soils. These soils have more clay in the subsoil than the Downs soil. They are in depressional areas. Also included, on foot slopes in some areas along the major streams, are soils that are subject to rare flooding. Included soils make up 5 to 10 percent of the unit.

Air and water move through the Downs soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during the spring. The surface layer is slightly acid because of local liming practices. The subsoil is strongly acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture and hay, and woodland. It is moderately suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. The shrink-swell potential also is a limitation on sites for dwellings without basements. Installing subsurface tile drains near the foundations lowers the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains lower the water table.

The land capability classification is IIe.

415—Orion silt loam. This nearly level, somewhat poorly drained soil is on flood plains and the bottom of upland stream valleys. It is frequently flooded for brief periods from March through May. Individual areas are irregular in shape and range from 7 to 160 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 5 inches thick. Below this is dark brown and brown, mottled, friable silt loam about 24 inches thick. The next 28 inches is a buried soil. It is very dark gray, mottled, friable and firm clay loam. The underlying material to a depth of 60 inches is dark gray, mottled, firm silt loam. In places the buried soil is farther from the surface. In some areas the surface layer is thicker and darker.

Included with this soil in mapping are small areas of the well drained Huntsville soils and the poorly drained

Sawmill soils. Huntsville soils are nearer to the streams than the Orion soil and are slightly higher on the landscape. Sawmill soils contain more clay than the Orion soil. They are in old oxbows in the lower areas. Included soils make up 10 to 15 percent of the unit.

Air and water move through the Orion soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderately low. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to openland wildlife habitat, and to wetland wildlife habitat. It is moderately suited to pasture and hay and to woodland. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard. Also, the seasonal high water table can delay planting in some years. Flooding is less frequent than once every years during the growing season. Dikes or diversions reduce the extent of the crop damage caused by floodwater. Selecting varieties adapted to shorter growing seasons and wetter conditions also reduces the extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

In areas used for pasture or hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

If this soil is used as woodland, the equipment limitation is a management concern. Plant competition also is a concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

451—Lawson silt loam. This nearly level, somewhat poorly drained soil is on flood plains and the bottom of upland stream valleys. It is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 4 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 12 inches thick. The subsurface layer also is very dark grayish brown, friable silt loam. It is about 19 inches thick. The underlying material to a depth of 60 inches is stratified dark grayish brown, brown, and very dark grayish brown, mottled, friable silt loam that has iron concretions. In places a firm buried soil high in content of clay is within a depth of 40 inches. In some areas the dark surface layer is thinner. In other areas the depth to the seasonal high water table is less than 1 foot or more than 3 feet.

Included with this soil in mapping are small areas of the moderately well drained Downs and well drained Fayette soils. These soils are on terraces and are higher on the landscape and are nearer to bluffs than the Lawson soil. Also, they have more clay in the subsoil. They make up 10 to 15 percent of the unit.

Air and water move through the Lawson soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The surface layer is mildly alkaline, and the subsurface layer is neutral. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is generally unsuited to dwellings and septic tank absorption fields because of the flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard. Also, the seasonal high water table can delay planting in some years. Dikes or diversions reduce the extent of the crop damage caused by floodwater. Selecting crop varieties adapted to shorter growing seasons and wetter conditions also reduces the extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain productivity and tilth.

If this soil is used for pasture and hay, the flooding is a hazard and the seasonal wetness is a limitation. Dikes or diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIw.

533—Urban land. This map unit occurs as areas covered by buildings, sewage treatment plants, asphalt, cinder and concrete pavement, and railroad tracks. It is mainly in the industrial and commercial areas of Galesburg. Because of extensive land smoothing, it generally is nearly level to sloping. Individual areas are rectangular and range from 10 to 400 acres in size.

More than 85 percent of this map unit is covered by pavement and buildings. The paved areas are in parking lots; on sites for educational institutions, commercial facilities, and shopping centers; and in the switch yard of the Burlington Northern Railroad.

Included with this unit in mapping are small areas of silty Orthents. These soils make up less than 15 percent of the unit.

Urban land is drained through sewer systems, gutters, and tile drains. Because runoff is rapid, the supply of water available for trees and shrubs generally is low.

Vegetated areas make up less than 10 percent of this map unit. The vegetation consists mainly of grasses at the border of the urban areas and widely spaced trees and shrubs. Various species of weeds and grasses grow in a few idle spots along the edge of built-up areas. Special management increases the survival rate when trees and shrubs are planted and after they are established. Periodically providing supplemental water also helps the plants to survive.

This map unit has not been assigned a land capability classification.

536—Dumps, mine. This map unit consists of nearly level to very steep accumulations of refuse derived from the washing and separation of coal. Individual areas are irregularly shaped or fan shaped and range from 7 to 160 acres in size.

The refuse consists of shale and siltstone fragments, sandstone cobbles, coal fragments, and loamy material from the cast overburden. The material is loam, clay loam, silty clay loam, and silt loam and the shaly analogs of these textures. It is dominantly gray and black but is bright red in some burned areas. The entire unit is extremely acid.

Included with this unit in mapping are small areas of extremely acid water. Also included are escarpments near the water areas and near the edges of the mapped areas.

Surface runoff is ponded to very rapid. The runoff is toxic to most plants because of the extreme acidity. The material is compacted, has practically no organic matter, and erodes easily. The nearly level areas are wet.

This map unit is idle. It supports no vegetation, except for cottonwood, wild cherry, and boxelder in small included areas of natural soil.

If reclaimed, some areas can be developed for low-intensity recreational uses, such as shooting ranges and paths and trails. The major management concerns are the wetness of the nearly level areas and erosion and toxic runoff in the more sloping areas. Holding ponds help to keep the toxic runoff away from drainageways, areas of deep water, and adjacent cropland. Reclamation would include grading, shaping, and covering the areas with natural soil material that can support vegetation. The feasibility and extent of reclamation should be determined by onsite investigation.

This map unit has not been assigned a land capability classification.

549D2—Marseilles silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on upland side slopes and foot slopes. Individual areas are long and narrow and range from 3 to 60 acres in size.

Typically, the surface layer is brown, friable silt loam about 4 inches thick. The subsoil is silty clay loam about 32 inches thick. The upper part is yellowish brown and friable, and the lower part is mottled olive gray, light olive gray, and light olive brown and is firm. Light gray and light olive gray, firm shale and siltstone bedrock that crushes to silty clay loam is at a depth of about 36 inches. In some places the lower part of the subsoil and the underlying material contain more sand and sandstone. In other places the slope is less than 10 percent. In some areas the soil has calcareous underlying material and has a thinner silty layer. In other areas the surface layer and subsoil contain more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Atlas, moderately well drained Elco, and well drained Hickory soils. These soils are not underlain by shale and siltstone. Atlas and Elco soils formed partly in glacial till that has a paleosol. They are higher on the landscape than the Marseilles soils. Hickory soils formed predominantly in glacial till. They are in landscape positions similar to those of the Marseilles soil. Included soils make up 10 to 15 percent of the unit.

Air and water move through the upper part of the Marseilles soil at a moderate rate and through the underlying shale and siltstone at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is low. Organic matter content also is low. The surface layer is slightly acid because of local liming practices. The subsoil is strongly acid. The soft shale and siltstone bedrock at a depth of 20 to 40 inches restricts the rooting depth of some plants. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is poorly suited to cultivated crops and moderately suited to pasture and hay. It is well suited to openland and woodland wildlife habitat and is moderately well suited to woodland. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

If this soil is used for pasture and hay, erosion is a hazard. Proper stocking rates and timely deferment of grazing help to prevent overgrazing, surface compaction, excessive runoff, and a greater susceptibility to erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently

established. Planting the pasture species on the contour helps to control erosion.

Wild herbaceous plants, grain and seed crops, grasses, such as bromegrass and orchardgrass, and legumes, such as ladino clover, alsike clover, and red clover, can provide food and cover for openland wildlife. Measures that protect the habitat from grazing are needed.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings, the shrink-swell potential and the slope are limitations. On sites for dwellings with basements, the depth to bedrock also is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Limited cutting and land shaping can overcome the slope. The shale and siltstone bedrock can be excavated with some difficulty.

The depth to bedrock and the slow permeability are limitations if this soil is used as a site for septic tank absorption fields. The depth to the bedrock can be increased by providing suitable fill material. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the slow absorption of liquid waste.

The land capability classification is IVe.

549E—Marseilles silt loam, 15 to 30 percent slopes. This steep, well drained soil is on upland side slopes and foot slopes. Individual areas are long and narrow and range from 5 to 200 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 2 inches thick. The subsurface layer is yellowish brown, friable silt loam about 3 inches thick. The subsoil is mottled, firm silt loam about 30 inches thick. The upper part is yellowish brown and light yellowish brown, and the lower part is pale olive. Pale olive, extremely firm shale and siltstone bedrock that crushes to silt loam is at a depth of about 35 inches. In some places the lower part of the subsoil and the underlying material contain more sand and sandstone. In other places the soil has calcareous underlying material. In some areas the silty layer is thinner. In other areas the surface layer and subsoil contain more clay.

Included with this soil in mapping are small areas of the moderately well drained Elco, well drained Hickory, and somewhat poorly drained Lawson and Orion soils. These soils are not underlain by shale and siltstone. Elco soils formed partly in glacial till that has a paleosol. They are on side slopes above the Marseilles soil. Hickory soils formed predominantly in glacial till. They are in landscape positions similar to those of the Marseilles soil. Lawson and Orion soils formed in alluvium and are in the drainageways. Included soils make up 10 to 15 percent of the unit.

Air and water move through the upper part of the Marseilles soil at a moderate rate and through the underlying shale and siltstone at a slow rate. Surface runoff is rapid in wooded areas. Available water capacity is low. Organic matter content is moderately low. The surface layer is slightly acid, and the subsoil is medium acid. The soft shale and siltstone bedrock at a depth of 20 to 40 inches restricts the growth of roots. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for woodland and for woodland wildlife habitat. Some areas of timber also are used for pasture. This soil is moderately suited to woodland, to woodland wildlife habitat, and to pasture. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is management concern. It affects the seedlings of desirable species. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

This soil is suitable for grain and seed crops, for wild herbaceous plants, and for hardwood trees, which are needed in areas of woodland wildlife habitat. Food plots of grain or seed crops should be established only in the less steep areas. Also, the crops should be planted on the contour. Measures that protect the habitat from fire and grazing are needed.

If this soil is used for pasture, erosion is a hazard. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated also helps to control erosion.

The land capability classification is VIIe.

549G—Marseilles silt loam, 30 to 60 percent slopes. This very steep, well drained soil is on upland side slopes and foot slopes. Individual areas are long and narrow and range from 4 to 200 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsoil is silty clay loam about 28 inches thick. The upper part is yellowish brown and friable, the next part is yellowish brown and firm, and the lower part is olive, mottled, and very firm. Olive and light brownish gray, mottled, extremely firm shale and siltstone bedrock that crushes to silty clay loam is at a depth of about 34 inches. In some places the lower part of the subsoil and the underlying material contain more sand and sandstone. In other places the soil has calcareous underlying material. In some areas the surface layer is silty clay loam. In other areas the surface layer and subsoil contain more clay.

Included with this soil in mapping are small areas of the well drained Hickory and somewhat poorly drained Lawson and Orion soils. These soils are not underlain by shale and siltstone. Hickory soils formed predominantly in glacial till. They are in landscape positions similar to those of the Marseilles soil. Lawson and Orion soils formed in alluvium and are in drainageways. Included soils make up 10 to 15 percent of the unit.

Air and water move through the upper part of the Marseilles soil at a moderate rate and through the underlying shale and siltstone at a slow rate. Surface runoff is rapid in wooded areas. Available water capacity is moderate. Organic matter content is moderately low. The surface layer is strongly acid, and the subsoil is very strongly acid. The soft shale and siltstone bedrock at a depth of 20 to 40 inches restricts the rooting depth of some plants. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are used for woodland and woodland wildlife habitat (fig. 8). This soil is moderately well suited to woodland, woodland wildlife habitat, and pasture. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

This soil is suitable for grain and seed crops, for wild herbaceous plants, and for hardwood trees, which are needed in areas of woodland wildlife habitat. Food plots of grain or seed crops should be established only in the less steep areas. Also, the crops should be planted on the contour. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts that provide food for wildlife.

The land capability classification is VIIe.

567B2—Elkhart silty clay loam, 3 to 5 percent slopes, eroded. This gently sloping, well drained soil is along upland drainageways. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is yellowish brown, firm silty clay loam about 22 inches thick. It is mottled in the lower few inches. The underlying material to a depth of 60 inches is mottled yellowish brown and grayish brown, calcareous, friable silt loam. In places, the subsoil is thicker and the depth to free lime is more than 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are in the drainageways, formed in alluvium, and are subject to flooding. They make up 2 to 5 percent of the unit.

Air and water move through the Elkhart soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderate. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, to pasture and hay, to dwellings with basements, and to septic tank absorption fields. It is moderately suited to dwellings without basements.

In areas used for corn, soybeans, or small grain, further erosion is hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil or regularly adding other organic material helps to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation.

Figure 8.—A wooded area of Marseilles silt loam, 30 to 60 percent slopes.

Reinforcing the foundation or extending the foundation below the subsoil helps to overcome this limitation.

The land capability classification is IIe.

567C2—Elkhart silty clay loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on upland side slopes and at the head of drainageways. Individual areas are irregular in shape and range from 4 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 27 inches thick. It is yellowish brown and friable. The upper part is silty clay loam, and the lower part is mottled silt loam. The underlying material to a depth of 60 inches is mottled yellowish brown and grayish brown, calcareous, friable silt loam. In places, the subsoil is thicker and the depth to free lime is more than 40 inches. In some areas the lower part of the subsoil is firm and is higher in content of clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are in the drainageways, formed in alluvium, and are subject to flooding. They make up 5 to 10 percent of the unit.

Air and water move through the Elkhart soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderate. The surface layer is medium acid unless it is limed. The subsoil is slightly acid. The

shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings without basements. It is well suited to pasture and hay, to dwellings with basements, and to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. It can be controlled by a crop rotation that includes l or more years of forage crops, by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity and tilth.

Adapted forage and hay plants grow well on this soil. Proper stocking rates and timely deferment of grazing help to prevent overgrazing, surface compaction, excessive runoff, and a greater susceptibility to erosion. Applications of fertilizer are needed. The plants should not be grazed until they are sufficiently established. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the foundation below the subsoil helps to overcome this limitation.

The land capability classification is IIIe.

567D3—Elkhart silty clay loam, 8 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on upland side slopes and at head of drainageways. Individual areas are long and narrow and range from 3 to 160 acres in size.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 23 inches thick. The upper part is dark yellowish brown, mottled, firm silty clay loam, and the lower part is yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches is mottled gray and light brownish gray, calcareous, friable silt loam. In places, the subsoil is thicker and the depth to free lime is more than 40 inches. In some areas the subsoil is firm and is higher in content of clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Radford soils. These soils are in the drainageways, formed in alluvium, and are subject to flooding. They make up 5 to 10 percent of the unit.

Air and water move through the Elkhart soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. The surface layer is slightly acid because of local liming practices. The subsoil is medium acid. The surface layer is mostly subsoil material, which puddles and crusts easily after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. The soil is poorly suited to cultivated crops and well suited to pasture and hay. It is moderately suited to openland wildlife habitat, to dwellings, and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard and poor tilth is a limitation. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to keep soil loss within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material improve tilth and increase the rate of water intake.

Establishing pasture and hay crops helps to keep soil loss within tolerable limits. Seedbed preparation is difficult on severely eroded side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps in establishing forage species and in controlling further erosion. The plants should not be grazed until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to prevent surface compaction and excessive runoff.

If this soil is used as a site for dwellings, the slope is a limitation. On sites for dwellings without basements, the shrink-swell potential also is a limitation. Cutting, filling, and land shaping help to overcome the slope. Reinforcing the foundation or extending the foundation below the subsoil helps to overcome the shrink-swell potential.

The slope is a limitation if this soil is used as a site for septic tank absorption fields. Installing the distribution lines on the contour or cutting and land shaping help to overcome this limitation.

The land capability classification is IVe.

660C2—Coatsburg silty clay loam, 5 to 12 percent slopes, eroded. This sloping, poorly drained soil is on upland side slopes and foot slopes. Individual areas are irregular in shape and range from 2 to 20 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is mottled, firm clay loam about 52 inches thick. The upper part is olive gray and dark olive gray, and the lower part is gray. In places the surface layer is thinner and lighter colored. In some areas the slope is more than 12 percent.

Included with this soil in mapping are small areas of the moderately well drained Assumption soils and the well drained Hickory soils. Assumption soils are deeper to a firm subsoil that is high in content of clay than the Coatsburg soil and formed in a thicker mantle of loess. They are on the upper side slopes and shoulder slopes.

Hickory soils formed predominantly in glacial till and have less clay in the subsoil than the Coatsburg soil. They are on the steeper side slopes. Included soils make up 5 to 10 percent of the unit.

Air and water move through the Coatsburg soil at a very slow rate. Surface runoff is medium in cultivated areas. A perched seasonal high water table is within 1 foot of the surface during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is strongly acid. Root development is restricted by the firm subsoil. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, to pasture and hay, and to openland wildlife habitat. It is poorly suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, further erosion is a hazard. It can be controlled by a crop rotation that includes 1 or more years of forage crops, by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by a combination of these. Keeping tillage to a minimum, returning crop residue to the soil, and regularly adding other organic material help to maintain productivity, prevent surface compaction and crusting, and improve tilth.

Establishing pasture plants and hay helps to control erosion. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated also helps to control erosion.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing either tile drains near the foundations or interceptor drains higher on the side slopes than the building helps to lower the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the very slow permeability are limitations if this soil is used as a site for septic tank absorption fields. Installing subsurface interceptor tile drains higher on the side slopes than the absorption field helps to lower the water table. Specially designed systems that include sand filters are needed to overcome the very slow permeability.

The land capability classification is IIIe.

801B—Orthents, silty, gently sloping. These somewhat poorly drained soils are mainly in cut and filled upland areas around cloverleaf interchanges and the airport near Galesburg. Individual areas are irregularly shaped or rectangular and range from 3 to 160 acres in size.

Typically, these soils are dark yellowish brown and dark grayish brown, mottled silty clay loam and silt loam to a depth of 60 inches. In some areas they are covered with as much as 2 feet of coarser textured fill material, which includes gravel and stones. In other areas the content of sand is more than 15 percent.

Included with these soils in mapping are some areas of Urban land and borrow areas near Interstate 74 and other major highways. Also included are small areas of Ipava, Sable, and Tama soils and a few areas around the cloverleaf interchanges where the soils are sloping or strongly sloping. Included soils make up 10 to 15 percent of the unit.

Air and water move through the Orthents at a moderate or moderately slow rate. Surface runoff is slow or medium. The seasonal high water table is 1 to 3 feet below the surface during the spring. Available water capacity is high. The shrink-swell potential is moderate or high, and the potential for frost action is high.

Most areas are used as sites for homes, roadways, or commercial buildings. These soils are moderately suited to picnic areas and playgrounds and are poorly suited to dwellings, local roads and streets, and septic tank absorption fields.

The seasonal high water table and the shrink-swell potential are the main limitations if these soils are used as sites for dwellings. Installing subsurface tile drains near the foundation reduces the wetness. Extending footings or reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate or moderately slow permeability are limitations if these soils are used as sites for septic tank absorption fields. Subsurface tile drains lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the filter field or providing better suited fill material helps to overcome the restricted permeability.

Low strength, the high potential for frost action, and the shrink-swell potential are limitations if these soils are used as sites for local roads and streets. These limitations can be overcome by strengthening or replacing the base material. Removing excess water helps to prevent the damage caused by frost action and by shrinking and swelling. Grading and shaping the roadway and ditching and banking the roadsides help to remove the water.

The seasonal high water table is the main limitation if these soils are used as sites for playgrounds and picnic areas. Subsurface tile drainage helps to lower the water table.

This map unit has not been assigned a land capability classification.

802B—Orthents, loamy, gently sloping. These somewhat poorly drained to well drained soils are in areas that formerly were sanitary landfills. In some areas the landscape was altered by cutting and mixing before

the fill was added. In other areas the landfill material was placed directly on natural soil. Individual areas are irregularly shaped or rectangular and range from 4 to 30 acres in size.

These soils are a mixture of rocks, concrete, bricks, rubber tires, aluminum, steel scraps, trash, and other debris surrounded and covered by soil material. A layer of soil material, which generally is loamy and is as much as 2 feet thick, was spread over the waste after the landfill was leveled and compacted by heavy equipment.

Included with these soils in mapping are some steep slopes and escarpments along berms, borders, or drainageways.

The rate of air and water movement through these soils varies. It is much more rapid in the material containing the larger blocks of refuse than in other material. Surface runoff is slow or medium in all areas, except for shallow depressions, which are ponded following periods of significant rainfall. Available water capacity is low. Natural fertility and organic matter content also are low. Subsidence is a hazard in areas where organic waste decays.

Almost all of the acreage currently is open, idle land. One area in the southeastern part of Galesburg, however, is used as a site for homes and a neighborhood park. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas.

This map unit has not been assigned a land capability classification.

863—Pits, clay. This nearly level to steep map unit consists of excavations in areas of Pennsylvanian shale from which clayey soil material has been removed. The walls of the pits are very steep or nearly vertical. The bottom is nearly level. Individual areas are oblong and range from 2 to about 50 acres in size.

Included with this unit in mapping are brick heaps and loamy soil material adjacent to the pits and areas of exposed bedrock and water at the bottom of the pits. Included areas make up 5 to 10 percent of the unit.

Most of the acreage currently is idle land. Some areas support a few trees. Others are ponded.

Water-filled areas are suited to recreational activities, such as fishing and swimming (fig. 9). Hiking is another possible recreational use in some areas. If reclamation measures are applied, other recreational uses might be possible. The feasibility and extent of reclamation should be based on the desired alternative use and individual site conditions.

This map unit has not been assigned a land capability classification.

864—Pits, quarries. This map unit consists of an excavation from which limestone has been removed and the piles of rock fragments and other spoil material surrounding the excavation. In places the soil material is thick enough to support vegetation. The unit occurs as one irregularly shaped area about 80 acres in size.

The rate of air and water movement through the soil material varies. Surface runoff is rapid in the more sloping areas and ponded on the bottom of the excavations.

Part of the excavation is used for camping, fishing, swimming, and boating. Water-filled areas and the less sloping surrounding areas are suited to fishing, boating, camping, hiking, and swimming. Reclaiming these areas by grading and shaping and by covering barren areas with soil material increases the number of potential uses of this unit. The feasibility and extent of reclamation should be based on the desired alternative use and individual site conditions.

This map unit has not been assigned a land capability classification.

865—Pits, gravel. This map unit consists of excavations from which sand and gravel have been or are being removed and the piles of sand and gravel and other spoil material surrounding the excavations. In places the soil material is thick enough to support vegetation. Individual areas are irregularly shaped or circular and range from less than 2 acres to 50 acres in size.

Included with this unit in mapping are some small areas of natural soils on haulage roads or lanes.

Air and water move through the soil material at a rapid rate. Surface runoff is slow. Ponding occurs on the bottom of the excavations.

Some of the abandoned pits that contain water are used for fishing or swimming. These pits are suited to recreational activities, including boating, fishing, and swimming. They also are suited to habitat for waterfowl. Camping and hiking are possible in the surrounding areas. The abandoned pits containing no water are suited to hiking and possibly to openland wildlife habitat if enough soil material can be spread over the area to allow for plant growth. Grading, shaping, and filling the pits, especially the smaller ones, can increase the number of possible uses. The feasibility and extent of reclamation should be based on the desired alternative uses and individual site conditions.

This map unit has not been assigned a land capability classification.

871B—Lenzburg silty clay loam, 1 to 7 percent slopes. This gently sloping, well drained soil is in surface-mined areas on uplands. Individual areas are irregular in shape and range from 5 to 400 acres in size.

Typically, the surface layer is dark grayish brown, friable silty clay loam about 2 inches thick. The upper part of the underlying material is mixed grayish brown and yellowish brown, calcareous, friable silty clay loam about 15 inches thick. The lower part to a depth of 60 inches is mixed brown and yellowish brown, mottled,

Figure 9.—A water-filled area of Pits, clay.

calcareous, friable channery loam. Shale channers are common throughout the soil.

Included with this soil in mapping are small areas of haulage roads and, adjacent to pits and the final cut, some steep and very steep areas that are not leveled. Also included are shallow trenches and depressions, some containing water, and a few areas of deep water. Included areas make up 10 to 15 percent of the unit.

Air and water move through the Lenzburg soil at a moderately slow rate. Surface runoff is slow or medium in pastured areas. Available water capacity is moderate. Organic matter content is low. Reaction is neutral in the surface layer and mildly alkaline in the upper part of the underlying material. The supply of available phosphorus is low. The content of rock fragments ranges from 10 to 35 percent by volume. Surface crusting is common after hard rains. Some differential settling can occur. The rock and dense soil fragments in the underlying material tend to restrict roots. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture and hay. This soil is well suited to cultivated crops, to pasture and hay, and to openland and woodland wildlife habitat. It is

moderately suited to woodland, to dwellings, and to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. It can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and adding other organic material improve tilth.

Adapted forage and hay plants grow well on this soil. Erosion is a hazard on short slopes and in depressions, and the occasional stones on the surface are a limitation. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion. A no-till method of pasture renovation and contour seeding also reduce the susceptibility to erosion. The plants should not be grazed or clipped until they are sufficiently established. In some areas that are inaccessible to machinery, the only way to seed the pasture or apply fertilizer is by airplane or by hand.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

Wild herbaceous plants, grain and seed crops, grasses, such as bromegrass and orchardgrass, and legumes, such as ladino clover, alsike clover, and red clover, can provide food and cover for openland wildlife. Measures that protect the habitat from grazing are needed. The included shallow depressions and areas of deep water can be used as nesting areas by certain types of waterfowl. The areas of deep water are used for fishing and boating.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The moderately slow permeability is a limitation if this soil is used as a site for septic tank absorption fields. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

871D—Lenzburg silt loam, 10 to 20 percent slopes. This strongly sloping, well drained soil is in surface-mined areas on uplands. Slopes are generally 100 to 200 feet long. Individual areas are irregular in shape and range from 10 to 600 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 2 inches thick. The upper part of the underlying material is mixed dark yellowish brown and yellowish brown, calcareous, friable channery loam about 17 inches thick. The lower part to a depth of 60 inches is mixed light yellowish brown and black, calcareous, firm channery silty clay loam. Shale channers are common throughout the soil. Some areas have surface stones as much as 15 inches in diameter.

Included with this soil in mapping are haulage roads and lanes used for transporting the mined coal and steep and very steep areas, some of which are adjacent to pits and to the final cut. Also included are shallow trenches and depressions, many containing water, and very few areas of deep water. Included areas make up 10 to 15 percent of the unit.

Air and water move through the Lenzburg soil at a moderately slow rate. Surface runoff is rapid in pastured areas. Available water capacity is moderate. Organic matter content is low. Reaction is neutral in the surface layer and mildly alkaline in the upper part of the underlying material. The supply of available phosphorus is low. The content of rock fragments ranges from 10 to 35 percent by volume. Crusting and sealing of the surface layer are common after hard rains. Some areas are subject to differential settling and slumping. The rock and dense soil fragments in the underlying material tend to restrict roots. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for pasture. Some of the acreage is idle land. This soil is moderately suited to pasture and hay and to woodland. It is generally unsuited to cultivated crops because of the slope. It is well suited to openland and woodland wildlife habitat. It is moderately suited to camp and picnic areas and to dwellings and is poorly suited to septic tank absorption fields.

Adapted forage and hay plants grow well on this soil. Erosion is a hazard on short slopes and in depressions, and the occasional stones on the surface are a limitation. Overgrazing causes surface compaction, excessive runoff, and a greater susceptibility to erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion. A no-till method of pasture renovation and contour seeding also reduce the susceptibility to erosion. The plants should not be grazed or clipped until they are sufficiently established. In some areas that are inaccessible to machinery, the only way to seed the pasture or apply fertilizer is by airplane or by hand.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a

cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

This soil is suitable for grain and seed crops and for grasses and legumes, such as bromegrass, orchardgrass, ladino clover, alsike clover, and red clover, which are necessary in areas of openland wildlife habitat. Measures that protect the habitat from grazing are needed. The included shallow depressions and areas of deep water are used as nesting areas by certain types of waterfowl. The areas of deep water are used for fishing and boating.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting, filling, and land shaping help to overcome the slope. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The moderately slow permeability and the slope are limitations if this soil is used as a site for septic tank absorption fields. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome the moderately slow absorption of liquid waste. Installing the distribution lines on the contour or cutting and land shaping help to overcome the slope.

The land capability classification is VIe.

871G—Lenzburg loam, 20 to 70 percent slopes. This very steep, well drained soil is in surface-mined areas on uplands characterized by ridges and swales. Slopes generally are 50 to 100 feet long. The swales are subject to ponding. Individual areas are irregular in shape and range from 10 to 600 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 2 inches thick. The underlying material to a depth of 60 inches is mixed dark greenish gray, yellowish brown, and brown, calcareous, firm clay loam. Shale channers are common throughout the soil. In some areas the ridgetops have been removed.

Included with this soil in mapping are shallow depressions and trenches, many containing water. Also included are haulage roads and construction areas where coal-processing machinery was located when the unit was mined. Included areas make up 10 to 15 percent of the unit.

Air and water move through the Lenzburg soil at a moderately slow rate. Surface runoff is very rapid in wooded areas. Available water capacity is moderate. Organic matter content is low. Reaction is neutral in the surface layer and moderately alkaline in the underlying material. The supply of available phosphorus is low. The content of rock fragments ranges from 10 to 35 percent by volume. Crusting and sealing of the surface layer are common after hard rains. Some areas are subject to differential settling and slumping. The rock and dense soil fragments in the underlying material tend to restrict roots. The shrink-swell potential and the potential for frost action are moderate.

Most of the acreage is idle land. Some areas support dense stands of timber. Some support grasses and are used for pasture. Others are used as sites for sportsmen's clubs. This soil is well suited to woodland wildlife habitat and poorly suited to pasture. It is moderately suited to woodland. It is generally unsuited to cultivated crops, dwellings, and septic tank absorption fields because of the slope.

If this soil is used for pasture, erosion is the major hazard. Also, large machinery generally cannot cross the short, very steep slopes. Therefore, the only method of seeding, applying fertilizer, and spraying is by airplane or by hand. Some kind of ground cover is essential to control erosion. Proper stocking rates, timely deferment of grazing, applications of fertilizer, and rotation grazing help to keep the pasture in good condition and help to control erosion.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. Logging roads and skid trails should established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grain and seed crops, wild herbaceous plants, and hardwood trees. Measures that protect the habitat from fire and grazing help to prevent depletion of the shrubs and sprouts, which provide food for the wildlife.

The numerous shallow ponds and areas of deep water provide good opportunities for fishing and boating. A large number of Canada geese and ducks use the shallow ponds and surrounding cover as nesting areas. Some of the areas where ridgetops have been removed are well suited to hiking.

The land capability classification is VIIe.

872B—Rapatee silty clay loam, 1 to 7 percent slopes. This gently sloping, well drained soil is in surface-mined upland areas that have been reclaimed. Individual areas are irregular in shape and range from 40 to 340 acres in size.

Typically, the surface layer is mixed black and very dark gray, friable silty clay loam about 3 inches thick. The upper part of the underlying material is mixed black and very dark gray, very firm silty clay loam about 15 inches thick. The next part is dark yellowish brown, very firm silty clay loam about 22 inches thick. The lower part to a depth of 60 inches is mixed brown, yellowish brown, and greenish gray, calcareous, very firm clay loam. It has a few coal and shale fragments. In places the mine spoil material is at the surface.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava, poorly drained Sable, and moderately well drained Tama soils. These soils are along the borders of the mapped areas. Also included are some steep areas adjacent to pits and the final cut and areas of shallow depressions, some of which contain water. Included areas make up 10 to 15 percent of the unit.

Air and water move through the Rapatee soil at a very slow rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The surface layer is slightly acid. The underlying material is slightly acid in the upper part and mildly alkaline in the lower part. The dense underlying material tends to restrict roots. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated (fig. 10). This soil is well suited to cultivated crops and moderately suited to pasture and hay. It is moderately suited to dwellings and poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. Also, the moderate available water capacity and restricted root zone are limitations. Erosion can be controlled by a conservation tillage system that leaves crop residue on the surface after planting, by contour farming, by terraces, or by a combination of these. The crop residue on the surface conserves moisture. Selection of short-season or drought-tolerant crop varieties can lessen the extent of crop damage.

Adapted forage and hay plants grow well on this soil. Overgrazing causes surface compaction and excessive runoff and increases the susceptibility to erosion. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the very slow permeability is a limitation. Increasing the size of the filter field or replacing the soil with more permeable material helps to overcome this limitation.

The land capability classification is IIe.

2036C—Tama-Urban land complex, 3 to 10 percent slopes. This gently sloping and sloping map unit occurs as areas of a moderately well drained Tama soil intermingled with areas of Urban land on upland ridgetops and side slopes. Individual areas are long and narrow or irregularly shaped and range from 80 to 240 acres in size. They are 45 to 55 percent Tama soil and 30 to 40 percent Urban land. The Tama soil and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Tama soil has a surface layer of very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is friable silty clay loam about 34 inches thick. The upper part is brown and dark yellowish brown, and the lower part is yellowish brown and mottled. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is lighter colored or thinner. In some areas, the subsoil is thinner and free lime is within a depth of 40 inches. In other areas a very firm, clayey buried soil is within a depth of 40 inches.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not possible.

Included with this unit in mapping are small areas of the somewhat poorly drained Radford and poorly drained Sable soils in drainageways below the Tama soil. Radford soils are subject to flooding. Included soils make up about 10 to 15 percent of the unit.

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium. The seasonal high water table is 4 to 6 feet below the surface during the spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential is moderate, and the potential for frost action is high.

The Tama soil is used for parks, building sites, lawns, and gardens. It is is well suited to lawns, landscaping, and vegetable and flower gardens and to camp areas, picnic areas, and playgrounds. It is moderately suited to dwellings and poorly suited to local roads and streets.

If the Tama soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations lowers the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Most homes on this unit are connected to a sanitary sewer system and treatment facility.

Low strength and the potential for frost action are limitations if this soil is used as a site for local roads and streets. They can be overcome by strengthening or

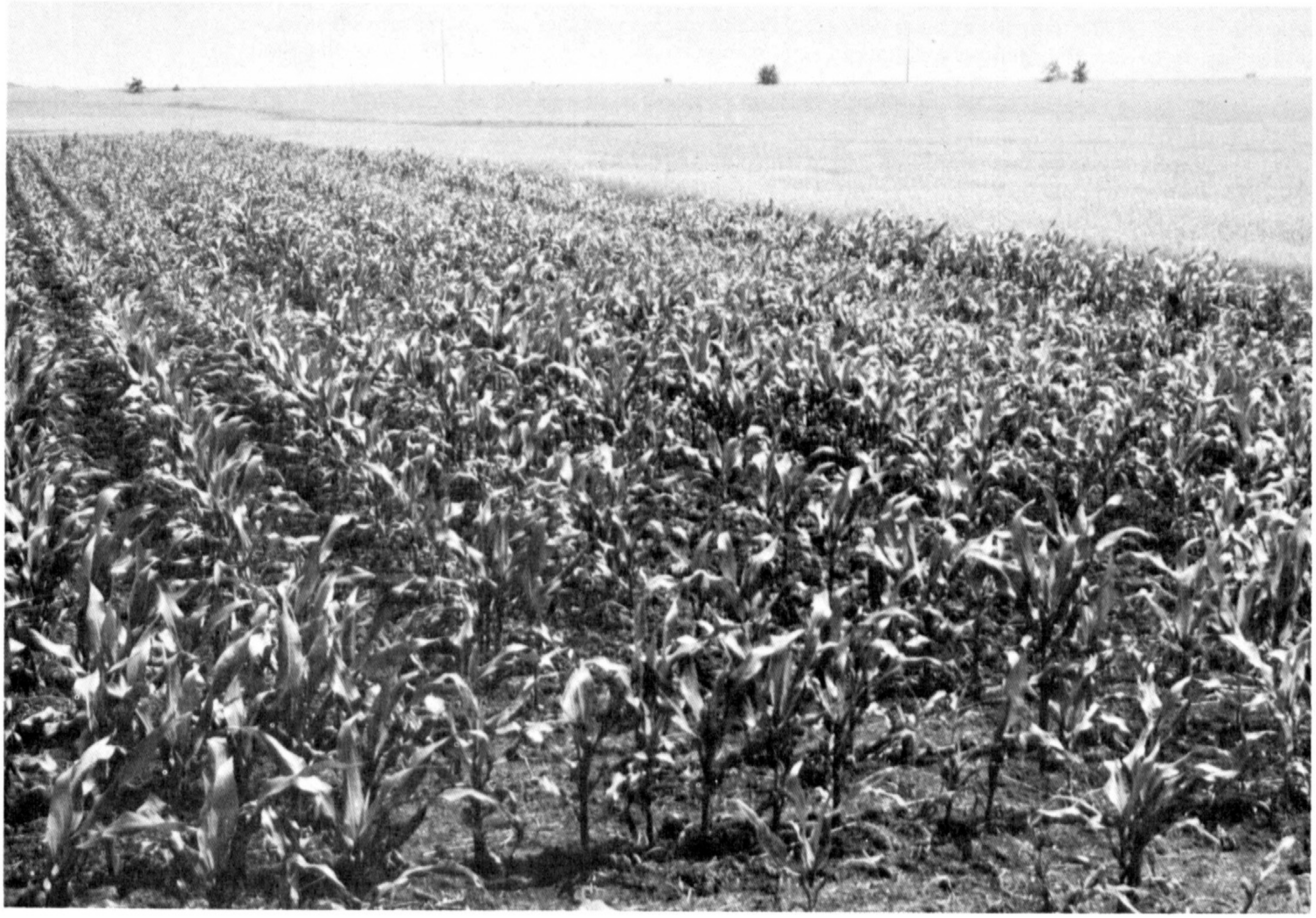


Figure 10.—Corn and wheat on Rapatee silty clay loam, 1 to 7 percent slopes.

replacing the base material; by grading and land shaping, which helps to remove excess water; and by ditching and banking the roadsides.

This map unit has not been assigned a land capability classification.

2901B—Ipava-Urban land-Tama complex, 1 to 5 percent slopes. This gently sloping map unit occurs as areas of a somewhat poorly drained Ipava soil on smooth upland flats intermingled with areas of Urban land and a moderately well drained Tama soil on upland ridges. Individual areas are circular or irregularly shaped and range from 40 to more than 500 acres in size. They are 30 to 40 percent Ipava soil, 25 to 35 percent Urban land, and 15 to 25 percent Tama soil. The Ipava and Tama soils and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Ipava soil has a surface layer of black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is mottled and friable. The upper part is brown silty clay loam, the next part is dark grayish brown silty clay, and the lower part is grayish brown silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam. In some areas the surface layer is lighter in color. In other areas it has been altered by scraping and leveling or by filling during construction.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not possible.

Typically, the Tama soil has a surface layer of black, friable silt loam about 9 inches thick. The subsurface layer is very dark gray, friable silt loam about 4 inches thick. The subsoil is silty clay loam about 34 inches thick. The upper part is brown and dark yellowish brown and is friable, and the lower part is yellowish brown, mottled, and friable. The underlying material to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the surface layer is lighter colored and thinner. In some areas the surface layer and the upper part of the subsoil have been altered by cutting and leveling during construction.

Included with this unit in mapping are small areas of the poorly drained Sable soils in drainageways and broad depressions. These soils make up 5 to 10 percent of the unit.

Air and water move through the Ipava soil at a moderately slow rate and through the Tama soil at a moderate rate. Surface runoff is slow on the Ipava soil and medium on the Tama soil. Most areas are drained by storm sewers, gutters, and drainage tile. In areas that have not been drained, a seasonal high water table is 1 to 3 feet below the surface of the Ipava soil and 4 to 6 feet below the surface of the Tama soil during the spring. Available water capacity is very high in both soils. Organic matter content is high. The shrink-swell potential is high in the Ipava soil and moderate in the Tama soil. The potential for frost action is high in both soils.

The Ipava and Tama soils are used for parks, building sites, lawns, and gardens. The Ipava soil is moderately suited and the Tama soil well suited to lawns, landscaping, and vegetable and flower gardens. The Ipava soil is moderately suited to picnic areas, and the Tama soil is well suited to camp and picnic areas. The Ipava soil is poorly suited and the Tama soil moderately suited to dwellings. Both soils are poorly suited to local roads and streets.

If the Ipava or Tama soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations lowers the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Erosion is a hazard if the surface of the construction site is bare. Most homes on this unit are connected to a sanitary sewer system and treatment facility.

If the Ipava or Tama soil is used as a site for local roads and streets, low strength, the potential for frost action, and the shrink-swell potential are limitations. They can be overcome by replacing or strengthening the base material and by ditching and banking the roadsides, which help to remove excess water.

If the Ipava soil is used for picnic or camp areas, wetness is a limitation during the spring unless the soil is drained. Subsurface tile drainage helps to overcome this limitation.

This map unit has not been assigned a land capability classification.

2902A—Ipava-Urban land-Sable complex, 0 to 3 percent slopes. This nearly level map unit occurs as areas of a somewhat poorly drained Ipava soil on smooth upland flats intermingled with areas of Urban land and a poorly drained Sable soil on broad upland flats, in shallow depressions, and in drainageways. The Sable soil is occasionally ponded for brief periods. Individual areas are round or irregularly shaped and range from 40 to more than 500 acres in size. They are 35 to 45 percent Ipava soil, 25 to 35 percent Urban land, and 20 to 30 percent Sable soil. The Ipava and Sable soils and Urban land occur as areas so intricately mixed that mapping them separately is not practical.

Typically, the Ipava soil has a surface layer of black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is about 32 inches thick. It is mottled and friable. The upper part is brown silty clay loam, the next part is dark grayish brown silty clay, and the lower part is grayish brown silty clay loam. The underlying material to a depth of 60 inches is light brownish gray, mottled, friable silt loam. In some areas the surface layer is lighter in color. In other areas it has been altered by scraping and leveling or by filling during construction. In places the depth to a seasonal high water table is more than 3 feet.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure the soils that identification of the soil series is not possible.

Typically, the Sable soil has a surface layer of black, friable silty clay loam about 6 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is gray and dark grayish brown, mottled, friable and firm silty clay loam about 23 inches thick. The underlying material to a depth of 60 inches is light gray, mottled, calcareous, friable silt loam. In places, the surface layer and subsurface layer are thinner and the subsoil contains more clay. In some areas the surface layer is covered by as much as 1 to 2 feet of fill material.

Air and water move through the Ipava soil at a moderately slow rate and through the Sable soil at a moderate rate. Surface runoff is slow on the Ipava soil and slow or ponded on the Sable soil. Most areas are drained by storm sewers, gutters, and subsurface drainage tile. In areas that have not been drained, a seasonal high water table is 1.0 to 3.0 feet below the surface of the Ipava soil and 0.5 foot above to 2.0 feet below the surface of the Sable soil during the spring. Available water capacity is very high in both soils. Organic matter content is high. The shrink-swell potential is high in the Ipava soil and moderate in the Sable soil. The potential for frost action is high in both soils.

The Ipava and Sable soils are used for parks, building sites, lawns, and gardens. The Ipava soil is moderately suited to lawns, landscaping, vegetable and flower gardens, and picnic areas. Both soils are poorly suited to dwellings and to local roads and streets.

If the Ipava and Sable soils are used as sites for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Also, ponding is a hazard on the Sable soil. Subsurface tile drains and surface inlet tile lower the water table. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Most homes on this unit are connected to a sanitary sewer system and treatment facility.

If the Ipava and Sable soils are used as sites for local roads and streets, low strength, ponding, the shrink-swell potential, and frost action are limitations. They can be overcome by strengthening or replacing the base material and by ditching and banking the roadsides, which help to remove excess water.

This map unit has not been assigned a land capability classification.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Figure 11.—An area of a Sable soil used as a site for dwellings. In areas where it is drained, this soil is considered prime farmland.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 289,453 acres in Knox County, or 62 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for crops, mainly corn and soybeans, which account for most of the local farm income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses (fig. 11). The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that have limitations, such as a seasonal high water table or frequent flooding during the growing season, qualify for prime farmland only in areas where these limitations have been overcome by such measures as drainage or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Approximately 414,000 acres in Knox County was used as farmland in 1978 (*12*). About 85,000 acres of this farmland was used for pasture and hay. The acreage used for pasture and hay is decreasing because livestock confinement systems are increasing in number and more land is being used for row crops. Corn and soybeans, the main row crops, are grown on about 266,815 acres in the county. Winter wheat and oats are the most common close-growing crops. Forage crops include smooth bromegrass, orchardgrass, Kentucky bluegrass, alfalfa, and red clover. Sunflowers are grown in a few areas. They could be grown in many other areas. Vegetable and nursery crops can be grown on most of the well drained or moderately well drained soils. Soils in low areas where frost is frequent and drainage is poor, however, generally are poorly suited to early vegetables and small fruits.

The potential of the soils in Knox County for increased production of food is fair. Some of the wooded areas are suitable for row crops, and some of the more recently reclaimed surface-mined land is currently used for pasture and hay or for row crops. Food production could also be increased by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

The paragraphs that follow describe the major management concerns on the cropland and pasture in the county. These concerns are water erosion, soil blowing, tilth, fertility, drainage, and flooding.

Water erosion is the major management concern on about 50 percent of the pasture and cropland in the county. If the slope is more than 2 percent, erosion is a hazard. Fayette, Rozetta, and Tama soils are the major erosive soils used for crops and pasture in the county.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils having a subsoil that is unfavorable for plant growth, such as Atlas and

Coatsburg soils; on soils that tend to be droughty, such as Alvin soils; and on soils that are already severely eroded, such as Sylvan soils. Second, erosion on farmland results in sedimentation in streams. Control of erosion minimizes this pollution and improves the quality of water available for municipal and recreation uses and for fish and other wildlife.

On clayey spots in many sloping fields, preparing a good seedbed and tilling are difficult because the original friable surface layer has been lost through erosion. Such spots are common in areas of the moderately eroded Assumption and Elkhart soils.

Measures that control erosion provide a protective plant cover, increase the rate of water infiltration, and reduce the runoff rate. A cropping system that keeps plants on the surface for extended periods reduces the susceptibility to erosion and preserves the productive capacity of the soils. On livestock farms, where pasture and hay are needed, including forage crops of grasses and legumes in the cropping sequence helps to control erosion in the more sloping areas. It also provides nitrogen and improves tilth for the following crop.

Terraces reduce the susceptibility to erosion by shortening the slopes and by controlling runoff. If a tile outlet terrace is used, the water that collects behind the terrace is removed by tile at a slow, controlled rate. Contour farming helps to control erosion through the formation of small ridges perpendicular to the slope of the land. The ridges greatly reduce the velocity of the water moving down the hills.

A conservation tillage system that leaves crop residue on the surface after planting is very effective in controlling erosion. This system creates a rough surface partly covered with crop residue. The crop residue increases the rate of water infiltration by improving tilth, protects the surface from the beating action of raindrops, helps to prevent surface crusting, and generally provides a more friable seedbed for good germination.

One system of conservation tillage used in Knox County is chisel tillage. When this system is applied, crop residue covers 20 to 60 percent of the surface, depending on the type of chisel plow used, the speed with which the equipment moves through the field, and kind of crop planted. Chisel tillage often follows stalk chopping in the fall, but it can also be used immediately prior to planting in the spring.

Another system is no-till, which is being used on an increasing acreage in the county. When this system is applied, a grain crop, generally corn, is planted directly in a cover crop, sod, or the previous year's crop residue. A special planter that disturbs only the row area is used. Herbicides are used to control competing vegetation. The nearly complete ground cover protects the soil from the beating impact of raindrops and the action of water flowing on the surface.

Erosion-control measures are effective alone or in combination on most of the farmland in the county. The combination used and its effectiveness depend on soil characteristics and topography. Information about the design of erosion-control practices for each kind of soil is provided in the Technical Guide, which is available in the local office of the Soil Conservation Service.

Soil blowing is a hazard on the Alvin sandy loams that are used for cultivated crops. Maintaining a plant cover or a surface mulch or keeping the surface rough through proper tillage minimizes this hazard. Field windbreaks also are effective in controlling soil blowing.

Soil tilth affects the germination of seeds and the rate of water infiltration. Some of the soils in Knox County have a silt loam surface layer that is low in content of organic matter. Generally, the structure of such soils is weakened by tillage. A crust forms on the surface during periods of intensive rainfall. The crust is hard when dry and is nearly impervious to water. As a result, it reduces the infiltration rate and increases the runoff rate and the susceptibility to erosion. Regular additions of crop residue, manure, and other organic material improve soil structure and help to prevent crusting. A conservation tillage system that leaves crop residue on the surface after planting also helps to prevent crusting.

Tilth can be a problem in the poorly drained, dark Edinburg, Sable, and Sawmill soils, which have a silty clay loam surface layer. These soils stay wet until late in spring. If they are tilled when wet, they tend to be very cloddy when dry. As a result, preparing a good seedbed is difficult.

A surface layer of silt loam or silty clay loam commonly has a plowsole or plowpan in the lower part. This pan reduces the rate of water infiltration and can increase the runoff rate and thus the susceptibility to erosion.

Soil drainage is a management concern on much of the acreage used for crops and pasture in Knox County. Most of the soils are already tile drained, but many drainage systems are old and should be replaced if maximum efficiency is to be achieved.

Some soils are naturally so wet that the production of crops generally would not be possible without a drainage system. These are the poorly drained Denny, Edinburg, Sable, and Sawmill soils. Most of these soils have been drained. Unless a drainage system is installed, the wetness of Clarksdale, Ipava, Lawson, Littleton, Orion, Radford, and other somewhat poorly drained soils can delay planting during some years.

Assumption, Atlas, Coatsburg, and Elco soils generally are not wet, but they have a firm and very firm, clayey paleosol, which restricts the downward movement of water. The water tends to perch on the firm or very firm layer. As a result, seepage is a problem in the areas on side slopes where it surfaces. The wetness of these seepy areas occasionally delays planting or harvesting.

The design of surface and subsurface drainage systems varies with the kind of soil and the availability of drainage outlets. In some areas of the poorly drained

soils in depressions, a combination of surface drains and tile drains is needed. The tile should be more closely spaced in the more slowly permeable soils than in the more rapidly permeable soils.

Further information about drainage systems is provided in the Technical Guide, which is available in local offices of the Soil Conservation Service and the Cooperative Extension Service.

Flooding is a hazard in some areas of the county. Some of the soils are flooded by stream overflow almost yearly. Others are flooded less frequently than once every 2 years during the growing season. Levees can protect the adjacent soils. The flood-prone soils are better suited to the crop varieties that require a relatively short growing season than to other varieties. Also, they are better suited to the less intensive land uses than the more intensive ones.

Soil fertility varies in the soils on uplands in Knox County. The light colored soils, such as Fayette, Keomah, and Rozetta soils, are more acid in the subsoil and less fertile than the dark Ipava, Sable, and Tama soils. Lawson, Sawmill, and other soils on flood plains are neutral to moderately alkaline throughout and are naturally high in content of plant nutrients. Soils that are severely eroded and have lost all of their natural, nutrient-rich topsoil, such as some Assumption and Elkhart soils, are much less fertile than uneroded or moderately eroded soils in the same series.

Most of the light colored upland soils are naturally acid. As a result, periodic applications of lime are needed. They also are needed on dark soils, which become acid when they are farmed and when certain fertilizers are applied.

Natural phosphorus levels in the soils on loess-covered uplands are high. On all soils the kind and amount of lime and fertilizer to be applied should be based on soil tests, on the needs of the crop, and on the desired level of yields. The Cooperative Extension Service can help in determining the kind and amount needed.

The supply of available phosphorus is low in Lenzburg soils, which are in surface-mined areas. Applications of fertilizer generally are needed if these soils are used for forage crops. Rapatee soils also are in surface-mined areas. If these soils are row cropped, the kind and amount of fertilizer to be applied should be based on the results of soil tests.

Under the heading "Detailed Soil Map Units," many of the soils are described as *well suited, moderately suited,* or *poorly suited* to cultivated crops and small grain. Erosion can be kept within tolerable limits on these soils. If erosion cannot be kept within these limits, the soil is described as *unsuited.*

In general, *well suited* soils are in capability classes I or II. Limitations affecting the choice of crops are slight or moderate, or moderate conservation measures are needed to keep erosion within allowable limits. *Moderately suited* soils are in capability class III. Severe limitations, including moderately steep slopes, wetness, and low available water capacity, affect the choice of crops, or special conservation measures are needed to keep erosion within tolerable limits. *Poorly suited* soils are in capability class IV. Very severe limitations, including very steep slopes and the effects of past erosion, affect the choice of crops, or very special conservation measures, management practices, or both are needed to keep erosion within tolerable limits.

Many of the soils also are described as *suited* or *poorly suited* to pasture and hay. In general, those that are *suited* are well drained, moderately well drained, or somewhat poorly drained soils in which wetness is not a problem in most years. Available water capacity is high enough for the soils to support the forage crop throughout the summer. Slopes range from 1 to 30 percent. Pasture renovation may not be economically feasible in areas where slopes are more than 25 percent.

Soils that are described as *poorly suited* to pasture and hay are poorly drained or very poorly drained or have slopes of 30 to 70 percent. The poorly drained or very poorly drained soils have slopes of 0 to 2 percent. Those that are in depressions or near streams are subject to ponding or flooding in the spring. The soils that have slopes of more than 30 percent are so steep that seeding, harvesting, and maintaining the forage crop are very difficult.

The latest information about the suitability of the soils for crops and pasture can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents (*5*). Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop

residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (*10*). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Don Howerton, state forester, Soil Conservation Service, helped prepare this section.

In 1978, Knox County had about 26,796 acres of woodland (*12*). Since early settlement, much of the woodland has been cleared and used for row crops. Much of the remaining woodland is in areas that are too steep, too wet, or too remote and isolated for row cropping. Each year, some land is cleared, generally in parcels ranging from several acres to a quarter of an acre.

Many of the steeper areas are subject to severe erosion after they are cleared. The timber canopy and the accumulation of leaf litter on the surface provide very effective protection from the impact of raindrops and the force of flowing water on the surface. Once this cover is removed, extensive erosion is possible. The hazard is very severe in some of the strongly sloping areas that are cleared for use as marginal farmland. As a result, these areas are better suited to timber than to row crops.

Harvesting on private land is generally on steep or very steep soils, such as Elco, Hickory, and Marseilles soils, or on the wet soils on flood plains, such as the Lawson and Sawmill soils that have not been disturbed for a number of years. Selectively cutting white oak, hickory, ash, and walnut for sawlogs is the most common harvesting method. Some softwood trees are harvested for pulpwood.

The largest areas of woodland are in soil associations 4 and 5, which are described under the heading "General Soil Map Units." The most common trees in the uplands are white oak, northern red oak, hickory, white ash, green ash, sugar maple, silver maple,

boxelder, walnut, and American elm. The most common trees on the bottom land are cottonwood, sycamore, willow, white oak, and hickory.

Many of the existing stands can be improved by thinning out mature trees and trees of low value. Measures that protect the woodland from fire and grazing are needed. Logging trails and access roads are commonly on steep soils. Shaping and seeding these trails and roads and applying fertilizer immediately after harvest help to control erosion. Properly shaped and constructed water bars across the trails also help to control erosion. Interplanting is needed for maximum woodland production. Control or removal of competing vegetation, such as the trees of low value, is needed if seedlings are planted. A grass cover is needed between rows of seedlings planted on bare, sloping land.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 through 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not to exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. It applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, represents an expected volume produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Many farmsteads and feedlots in Knox County are on nearly level or gently sloping soils that support no trees. Common examples are Clarksdale, Denny, Downs, Fayette, Ipava, Keomah, Rozetta, Sable, and Tama soils. If careful consideration is given to species and site selection, site preparation, planting technique, spacing, and maintenance, windbreaks can be established on these soils. The common trees and shrubs in windbreaks are northern white-cedar, eastern white pine, Norway spruce, Amur honeysuckle, autumn-olive, gray dogwood, flowering dogwood, Russian-olive, silky dogwood, eastern cottonwood, and pin oak.

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Knox County has some areas of scenic and historic interest. These areas are used mainly for camping, hiking, fishing, sightseeing, picnicking, and boating. Public areas available for recreation include Lake Storey (fig. 12), Wolf Covered Bridge Historical Site, and Carl Sandburg Birthplace Historical Site. There are numerous private recreational areas, including several large lakes and sportsmen's clubs. Hiking, fishing, boating, and hunting are the major uses in these areas. Many of the sportsmen's clubs are in areas of mine spoil, where numerous lakes have been created.

The demand for recreational facilities has increased greatly in the past several years. The potential for additional development of recreational facilities is good in soil associations 4 and 6, which are described under the heading "General Soil Map Units." These associations are characterized by hilly terrain, wooded slopes, and numerous small lakes that provide a variety of opportunities for recreation. Abandoned clay and gravel pits and rock quarries also offer opportunities for recreation because of the lakes that are commonly created in these areas and because of the timbered surrounding slopes. The major limitation in all the recreational areas is the slope.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table

Figure 12.—A recreational area adjacent to Lake Storey. This area is in the Rozetta-Elco-Clarksdale association.

12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Steve Brady, wildlife biologist, Soil Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and oats.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, soybeans, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, and wheatgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include owls, thrushes, woodpeckers, opossum, squirrels, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, muskrat, and beaver.

The soil associations described under the heading "General Soil Map Units" are grouped into two wildlife areas in the following paragraphs.

Wildlife area 1 consists of the Ipava-Sable, Tama-Ipava, and Lawson-Sawmill-Huntsville associations. The soils are nearly level to strongly sloping and are poorly drained to well drained. The Lawson-Sawmill-Huntsville association is subject to flooding.

This wildlife area is mainly cropland, much of which is used for corn and soybeans year after year. Many of the soils are fall plowed. Wildlife habitat is generally poor because of a lack of crop residue, herbaceous nesting and roosting cover, woody cover, and travel lanes or hedgerows.

Measures that can improve the habitat in this area include not mowing roadsides, waterways, and other areas until August, when nesting is complete; growing fine stemmed grasses, such as redtop, timothy, and smooth brome, instead of tall fescue in waterways and along roadsides; and allowing woody cover and brush to become established in fence rows. Protecting the woody cover and native vegetation along drainageways and streams helps maintain the habitat. Food and cover can be provided by planting rod-wide strips of grasses around cornfields, leaving crop residue untilled throughout the winter, or leaving 1/4-acre food plots of grain unharvested in each 40-acre field.

Wildlife area 2 consists of the Rozetta-Clarksdale-Elco, Hickory-Marseilles, and Lenzburg-Rapatee associations. The soils are nearly level to very steep and are somewhat poorly drained to well drained. This area generally borders the major streams in the county and is more diversified than wildlife area 1. It consists of cropland, pasture, woodland, and idle land. As a result, the habitat favors a variety of wildlife. Nongame species include those inhabiting areas of brushy cover and woodland as well as those inhabiting openland habitat.

The measures that can improve the habitat include those that are suggested for wildlife area 1. Protection of native vegetation or establishment of permanent vegetation, or greenbelts, along drainageways and streams, measures that protect woodland, greenbelts, and streams from grazing, and good pasture management also can improve the habitat.

A nesting population of Canada geese inhabits this area, primarily in the Lenzburg-Rapatee association. Maintenance or establishment of prairie grasses and management of wetland habitat improve the habitat for these geese.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if

the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In table 12, ratings are given only for area sanitary landfills. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

The landfill must be able to bear heavy vehicular traffic. It involves a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect landfills.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to

the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is

subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the

susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that is occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Bureau of Materials, Illinois Department of Transportation, Springfield, Illinois.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*11*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*9*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*11*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alvin Series

The Alvin series consists of well drained, moderately rapidly permeable soils on stream terraces and side slopes bordering the major stream valleys. These soils formed in windblown or water-deposited sandy loam. Slopes range from 2 to 30 percent.

Alvin soils commonly are adjacent to Camden, Elco, Fayette, and Hickory soils. All of the adjacent soils contain more clay and less sand in the control section than the Alvin soils. The moderately well drained Camden and well drained Hickory soils are in landscape positions similar to those of the Alvin soils. The

moderately well drained Elco and well drained Fayette soils are higher on the landscape than the Alvin soils.

Typical pedon of Alvin sandy loam, 8 to 15 percent slopes, 2,310 feet east and 1,221 feet north of the southwest corner of sec. 11, T. 9 N., R. 3 E.

A—0 to 5 inches; very dark gray (10YR 3/1) sandy loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; strongly acid; clear smooth boundary.

E1—5 to 9 inches; dark grayish brown (10YR 4/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; friable; very few distinct very dark grayish brown (10YR 3/2) organic films on faces of peds; medium acid; abrupt smooth boundary.

E2—9 to 20 inches; yellowish brown (10YR 5/4) sandy loam, very pale brown (10YR 7/4) dry; weak fine subangular blocky structure; friable; very few distinct very dark gray (10YR 3/1) organic films on faces of peds; medium acid; clear smooth boundary.

Bt1—20 to 28 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium and coarse subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—28 to 45 inches; strong brown (7.5YR 5/6) sandy loam; pale brown (10YR 6/3) pockets of loamy sand; weak medium subangular blocky structure; friable; few faint dark brown (7.5YR 4/4) clay bridges between sand grains; strongly acid; clear smooth boundary.

C—45 to 60 inches; yellowish brown (10YR 5/6) stratified sandy loam, loamy sand, and sand; many fine and medium distinct pale brown (10YR 6/3) mottles; mostly single grain but some weak coarse subangular blocky structure; friable; strongly acid.

The thickness of the solum ranges from 36 to 50 inches. Reaction is very strongly acid or medium acid in the control section and strongly acid to neutral in the C horizon.

The A horizon has chroma of 1 or 2. It is sandy loam or fine sandy loam. Some pedons have an Ap horizon. This horizon has chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It has thin layers of sandy clay loam, clay loam, or loamy sand in some pedons. The clay content ranges from 15 to 18 percent in the control section, and the content of sand ranges from 45 to 70 percent. The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6.

Assumption Series

The Assumption series consists of moderately well drained soils on shoulder slopes and side slopes in the uplands. These soils formed in loess and in the underlying loamy glacial till, which has a strongly developed paleosol. Permeability is moderate in the upper part of the solum and moderately slow in the lower part. Slopes range from 5 to 15 percent.

These soils do not have the 10-inch dark surface layer that is definitive for the Assumption series. This difference, however, does not significantly affect the usefulness or behavior of the soils.

Assumption soils are similar to Elco, Elkhart, and Tama soils and commonly are adjacent to Elkhart and Tama soils. Elco soils have a surface layer that is thinner than that of the Assumption soils. The well drained Elkhart and moderately well drained Tama soils formed entirely in loess. They are on side slopes and broad ridges above the Assumption soils.

Typical pedon of Assumption silt loam, 5 to 10 percent slopes, eroded, 1,850 feet north and 42 feet east of the southwest corner of sec. 5, T. 13 N., R. 2 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; few fine faint brown (10YR 4/3) mottles; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—9 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak very fine and fine subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) organic films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 27 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2Btg1—27 to 37 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; common prominent dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); medium acid; gradual smooth boundary.

2Btg2—37 to 57 inches; grayish brown (2.5Y 5/2) clay loam; common fine faint light brownish gray (2.5Y 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); few limestone pebbles; slightly acid; clear smooth boundary.

2Btg3—57 to 60 inches; dark gray (5Y 4/1) clay loam; many fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to weak fine angular blocky; firm; few distinct dark grayish brown (10YR 4/2) clay films on faces

of peds; few fine stains on faces of peds (iron and manganese oxides); few limestone pebbles; neutral.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess mantle ranges from 25 to 40 inches. The dark surface layer is 4 to 9 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. It is silt loam or silty clay loam. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is silt loam or silty clay loam. It ranges from medium acid to neutral. Some pedons have a 2Ab horizon. The 2B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 4. The clay content ranges from 30 to 45 percent in the control section and the sand content from 20 to 30 percent. Some pedons have a 2C horizon.

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on side slopes and foot slopes in the uplands. These soils formed in loess and in the underlying glacial till, which has a strongly developed paleosol. Slopes range from 10 to 18 percent.

Atlas soils are similar to Coatsburg soils and commonly are adjacent to Elco, Hickory, and Rozetta soils. Coatsburg soils have a mollic epipedon. The moderately well drained Elco soils are deeper to a firm layer than the Atlas soils. Also, they are higher on the landscape. The well drained Hickory soils formed dominantly in loamy glacial till that does not have a paleosol. They are lower on the landscape than the Atlas soils. The moderately well drained Rozetta soils formed entirely in loess. They are on the more gently sloping, higher parts of the landscape near ridgetops.

Typical pedon of Atlas silty clay loam, 10 to 18 percent slopes, severely eroded, 198 feet west and 1,155 feet north of the southeast corner of sec. 6, T. 12 N., R. 4 E.

Ap—0 to 6 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silty clay loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; strongly acid; abrupt smooth boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine faint yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few thin brown (10YR 4/3) clay films lining root channels; neutral; abrupt smooth boundary.

2Btg1—11 to 15 inches; dark gray (10YR 4/1) silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak fine angular blocky structure; very firm; few distinct gray (10YR 5/1) and common distinct very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2Btg2—15 to 25 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; very firm; common distinct gray (10YR 5/1) clay films on faces of peds; few fine concretions (iron and manganese oxides); very few limestone pebbles; medium acid; clear smooth boundary.

2Btg3—25 to 46 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure; very firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions (iron and manganese oxides); few limestone pebbles; slightly acid; clear smooth boundary.

2Btg4—46 to 60 inches; gray (5Y 5/1) silty clay; common fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; very firm; few distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine concretions (iron and manganese oxides); few limestone pebbles; slightly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the silty material ranges from 3 to 15 inches.

The Ap horizon has chroma of 2 or 3. The 2B horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is silty clay loam, clay loam, or silty clay. The clay content ranges from 35 to 45 percent and the sand content from 15 to 35 percent in the control section. Some pedons have a 2Cg horizon.

Camden Series

The Camden series consists of moderately well drained, moderately permeable soils on stream terraces and side slopes bordering the major stream valleys. These soils formed in loess and in the underlying loamy sediments. Slopes range from 2 to 18 percent.

Camden soils are similar to Fayette, Harvard, Rozetta, and Sylvan soils and commonly are adjacent to Fayette and Rozetta soils. The well drained Fayette and Sylvan and moderately well drained Rozetta soils formed entirely in loess. Fayette and Rozetta soils are in landscape positions similar to those of the Camden soils. Harvard soils have a surface layer that is thicker or darker than that of the Camden soils.

Typical pedon of Camden silt loam, 5 to 10 percent slopes, eroded, 1,056 feet east and 1,485 feet north of the southwest corner of sec. 11, T. 9 N., R. 3 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; dominantly weak medium subangular blocky structure but weak thick platy structure between depths of 6 and 8

inches; friable; few distinct very dark gray (10YR 3/1) organic films on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—8 to 18 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium angular blocky structure; friable; common distinct brown (10YR 4/3) clay films and common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt2—18 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct brown (10YR 4/3) clay films and common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt3—26 to 32 inches; yellowish brown (10YR 5/4) silty clay loam; noticeable sand grains; few fine faint yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); medium acid; clear smooth boundary.

BC—32 to 44 inches; yellowish brown (10YR 5/4) loam; few medium faint yellowish brown (10YR 5/8) and common fine and medium distinct light gray (10YR 6/1) mottles; weak coarse prismatic structure; friable; few thin very dark gray (10YR 3/1) organic films lining pores; few fine stains on faces of peds (iron and manganese oxides); few limestone pebbles; medium acid; clear smooth boundary.

2C—44 to 60 inches; brown (10YR 5/3) and yellowish brown (10YR 5/6) sandy loam, loam, and silt loam; noticeable sand grains; few fine faint yellowish brown (10YR 5/8) and common fine and medium distinct light gray (10YR 6/1) mottles; dominantly massive but some weak coarse prismatic structure; friable; slightly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the overlying loess layer ranges from 24 to 40 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Some pedons have an E horizon. The Bt and 2B horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. The Bt horizon ranges from strongly acid to neutral and the 2B horizon from medium acid to neutral. The 2B horizon is sandy loam, loam, or silt loam. It has noticeable sand grains in the lower part. The clay content ranges from 27 to 35 percent in the control section. The 2C horizon has value of 4 to 6 and chroma of 3 to 6. It is dominantly sandy loam or silt loam, but in some pedons it has thin strata of loamy sand at a depth of more than 50 inches.

Clarksdale Series

The Clarksdale series consists of somewhat poorly drained, moderately slowly permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 0 to 2 percent.

Clarksdale soils are similar to Keomah and Ipava soils and commonly are adjacent to Downs, Ipava, and Keomah soils. Downs soils are moderately well drained, have less clay in the subsoil than the Clarksdale soils, and are on the slightly higher or more sloping parts of the landscape. The somewhat poorly drained Ipava and Keomah soils are in landscape positions similar to those of the Clarksdale soils. Ipava soils have a mollic epipedon, and Keomah soils have a surface layer that is thinner or lighter colored than that of the Clarksdale soils.

Typical pedon of Clarksdale silt loam, 1,056 feet east and 198 feet north of the southwest corner of sec. 17, T 12 N., R. 3 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with some dark grayish brown (10YR 4/2) E material in the lower part; weak fine and medium subangular blocky structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

E—7 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; few fine distinct yellowish brown (10YR 5/6) and few fine faint light brownish gray (10YR 6/2) mottles; dominantly weak thin platy structure but some weak fine and medium subangular blocky structure; friable; few faint very dark grayish brown (10YR 3/2) organic films on faces of peds; medium acid; abrupt smooth boundary.

Bt1—10 to 16 inches; brown (10YR 5/3) silty clay loam; few fine faint light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; common distinct very dark grayish brown (10YR 3/2) organic films on faces of peds; common distinct dark brown (7.5YR 4/2) clay films on faces of peds; strongly acid; abrupt smooth boundary.

Bt2—16 to 23 inches; brown (10YR 5/3) silty clay; few fine faint light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm; common distinct very dark grayish brown (10YR 3/2) organic films on faces of peds and lining pores; common distinct brown (10YR 4/3) clay films on faces of peds and lining pores; few fine concretions (iron and manganese oxides); strongly acid; abrupt smooth boundary.

Btg—23 to 42 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown

(10YR 5/6 and 5/8) and common medium faint light brownish gray (10YR 6/2) mottles; weak fine prismatic structure; friable; few distinct very dark gray (10YR 3/1) organic films lining pores; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains on faces of peds and few fine concretions (iron and manganese oxides); neutral; clear smooth boundary.

Cg—42 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few distinct very dark gray (10YR 3/1) organic films lining pores; common medium stains on faces of vertical cracks and few fine concretions (iron and manganese oxides); slight effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The depth to carbonates is more than 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 to 6 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. It ranges from strongly acid to neutral. It is silty clay loam or silty clay. The clay content ranges from 35 to 42 percent in the control section. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 6.

Coatsburg Series

The Coatsburg series consists of poorly drained, very slowly permeable soils on side slopes and foot slopes in the uplands. These soils formed in loess and in the underlying loamy glacial till, which has a strongly developed paleosol. Slopes range from 5 to 12 percent.

Coatsburg soils are similar to Atlas soils and commonly are adjacent to Assumption, Elkhart, and Tama soils. Atlas soils do not have a mollic epipedon. The moderately well drained Assumption soils are deeper to a firm layer high in content of clay than the Coatsburg soils. The well drained Elkhart and moderately drained Tama soils formed entirely in loess. They do not have a paleosol. All of the adjacent soils are on side slopes or shoulder slopes above the Coatsburg soils. In places the Elkhart and Tama soils also are on broad ridgetops.

Typical pedon of Coatsburg silty clay loam, 5 to 12 percent slopes, eroded, 2,442 feet west and 363 feet north of the southeast corner of sec. 32, T. 13 N., R. 2 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; about 5 percent sand; slightly acid; abrupt smooth boundary.

2Btg1—8 to 16 inches; dark olive gray (5Y 3/2) clay loam, grayish brown (2.5Y 5/2) dry; few fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to weak very fine angular blocky; very firm; common prominent very dark gray (10YR 3/1) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); few limestone pebbles; medium acid; abrupt smooth boundary.

2Btg2—16 to 25 inches; olive gray (5Y 5/2) clay loam; common fine prominent yellowish brown (10YR 5/4 and 5/8) mottles; weak medium prismatic structure; very firm; few prominent dark gray (10YR 4/1) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); few limestone pebbles; strongly acid; clear smooth boundary.

2Btg3—25 to 36 inches; gray (5Y 5/1) clay loam; many fine and medium prominent yellowish brown (10YR 5/8) and few fine faint light olive gray (5Y 6/2) mottles; weak medium prismatic structure; very firm; few prominent dark gray (10YR 4/1) clay films on faces of peds and lining pores; many fine stains on faces of peds (iron and manganese oxides); few limestone pebbles; strongly acid; clear smooth boundary.

2Btg4—36 to 60 inches; gray (5Y 5/1) clay loam; many fine prominent light olive brown (2.5Y 5/4) and many fine faint light olive gray (5Y 6/2) mottles; weak coarse prismatic structure; very firm; few fine stains on faces of peds (iron and manganese oxides); dark gray (10YR 4/1) band in the upper 2 inches; few limestone pebbles; slightly acid.

The layer of loess is 10 to 15 inches thick. The mollic epipedon ranges from 10 to 24 inches in thickness.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is silt loam or silty clay loam. The 2Bt horizon has hue of 2.5Y or 5Y or is neutral in hue. It has value of 3 to 5 and chroma of 0 to 2. It is silty clay loam, clay loam, or silty clay. The clay content ranges from 35 to 45 percent in the control section and the sand content from 15 to 35 percent.

Denny Series

The Denny series consists of poorly drained, slowly permeable soils in closed depressions on uplands. These soils formed in loess. Slopes are 0 to 1 percent.

Denny soils are commonly adjacent to Ipava, Tama, and Sable soils. The adjacent soils are higher on the landscape than the Denny soils. They do not have a grayish brown subsurface layer. Ipava and Tama soils are better drained than the Denny soils. Sable soils have less clay in the control section than the Denny soils.

Typical pedon of Denny silt loam, 264 feet north and 132 feet west of southeast corner of sec. 31, T. 13 N., R. 2 E.

Ap— 0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; many fine faint grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure parting to weak medium granular; friable; few fine stains on faces of peds (iron and manganese oxides); slightly acid; clear smooth boundary.

A—4 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt wavy boundary.

Eg—9 to 19 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; many fine faint light gray (10YR 6/1) and many fine distinct dark brown (7.5YR 4/4) mottles; moderate thick platy structure; friable; medium acid; abrupt wavy boundary.

Btg1—19 to 21 inches; gray (10YR 5/1) silty clay loam; many fine distinct yellowish brown (10YR 5/8) mottles; strong very fine subangular blocky structure; firm; common distinct dark gray (5Y 4/1) clay films on faces of peds; few fine concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg2—21 to 26 inches; gray (10YR 5/1) silty clay loam; many coarse prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure; firm; distinct dark gray (5Y 4/1) clay films on faces of peds; few fine concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg3—26 to 34 inches; gray (10YR 5/1) silty clay; common medium prominent yellowish brown (10YR 5/8) and common fine faint light gray (10YR 6/1) mottles; moderate medium prismatic structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg4—34 to 44 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; firm; common distinct gray (10YR 5/1) clay films on faces of peds; common fine concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Btg5—44 to 52 inches; light gray (10YR 6/1) silty clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; firm; common faint gray (10YR 5/1) clay films on faces of peds; few fine concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

Cg—52 to 60 inches; light gray (10YR 6/1) silt loam; many medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few fine concretions (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 40 to 60 inches. The A horizon is 6 to 10 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. Unless limed, it is slightly acid or medium acid. The E horizon has value of 4 or 5 and chroma of 1 or 2. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is medium acid in the upper part and slightly acid to mildly alkaline in the lower part. It is silty clay loam or silty clay. The content of clay is 35 to 40 percent in the control section. The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2.

Dorchester Series

The Dorchester series consists of well drained, moderately permeable soils on flood plains and in upland drainageways. These soils formed in silty, calcareous alluvium. Slopes range from 0 to 2 percent.

Dorchester soils are similar to Orion soils and commonly are adjacent to Lawson and Sawmill soils. The somewhat poorly drained Lawson soils are not stratified in the upper 30 inches and are noncalcareous. They are in landscape positions similar to those of the Dorchester soils. Orion soils have a buried soil within a depth of 40 inches. Sawmill soils are poorly drained and are noncalcareous. They are in the slightly lower landscape positions.

Typical pedon of Dorchester silt loam, 132 feet east and 1,850 feet north of the southwest corner of sec. 23, T. 9 N., R. 3 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many very fine roots; slight effervescence; mildly alkaline; clear smooth boundary.

C—6 to 60 inches; stratified very dark grayish brown (10YR 3/2) and grayish brown (10YR 5/2) silt loam; appears massive but has weak bedding planes; friable; very thin strata of very fine sand; few fine concretions and few medium stains along root channels (iron and manganese oxides); strong effervescence; moderately alkaline.

The C horizon has value of 3 to 5 and chroma of 2 or 3. It is mildly alkaline or moderately alkaline and contains free carbonates throughout. Some pedons have 2Ab horizon. This horizon has hue of 10YR, value of 2, and chroma of 1 or 2. It is silty clay loam, silt loam, or clay loam. It is neutral or mildly alkaline.

Downs Series

The Downs series consists of moderately well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 2 to 6 percent.

Downs soils are similar to Elkhart, Rozetta, and Tama soils and commonly are adjacent to Huntsville, Lawson, Rozetta, and Tama soils. Elkhart soils have carbonates within a depth 40 inches. Rozetta and Tama soils are in landscape positions similar to those of the Downs soils. Rozetta soils have a surface layer that is thinner and lighter colored than that of the Downs soils, and Tama soils have one that is thicker or darker. The well drained Huntsville and somewhat poorly drained Lawson soils have a mollic epipedon that is more than 24 inches thick. They are on flood plains below the Downs soils.

Typical pedon of Downs silt loam, 2 to 6 percent slopes, 561 feet east and 693 feet south of northwest corner of sec. 34, T. 13 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with some brown (10YR 4/3) E material in the lower part; dominantly weak very fine and fine subangular blocky structure but some weak medium platy structure in the lower 2 inches; friable; slightly acid; abrupt smooth boundary.

Bt1—8 to 14 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—14 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium angular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—23 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—31 to 43 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few faint dark brown (10YR 3/3) and few distinct dark grayish brown (10YR 4/2) clay films on faces of peds and lining root channels; few fine stains on faces of peds (iron and manganese oxides); medium acid; clear smooth boundary.

BC—43 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam; many fine and medium distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure; friable; few faint very dark grayish brown (10YR 3/2) organic coatings lining root channels; common fine stains on faces of peds (iron and manganese oxides); neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It ranges from very strongly acid to medium acid in the most acid part. The clay content ranges from 27 to 35 percent in the control section.

Edinburg Series

The Edinburg series consists of poorly drained, slowly permeable soils in closed depressions on uplands. These soils formed in loess. Slopes are 0 to 1 percent.

Edinburg soils are similar to Denny and Sable soils and commonly are adjacent to Sable soils. Denny soils have a grayish brown subsurface layer. Sable soils have less clay in the control section than the Edinburg soils. Also, they are higher on the landscape.

Typical pedon of Edinburg silty clay loam, 1,980 feet east and 660 feet south of northwest corner of sec. 36, T. 9 N., R. 3 E.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; medium fine granular structure; friable; neutral; clear smooth boundary.

A—6 to 16 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate very fine subangular blocky structure; friable; few faint silt coatings on faces of peds; neutral; clear smooth boundary.

Btg1—16 to 25 inches; dark gray (5Y 4/1) silty clay; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few faint silt coatings on faces of peds; few fine stains on faces of peds (iron and manganese oxides); neutral; clear smooth boundary.

Btg2—25 to 39 inches; light gray (5Y 6/1) silty clay; many medium prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common faint very dark gray (10YR 3/1) clay films lining pores; common fine stains on faces of peds (iron and manganese oxides); slightly acid; clear smooth boundary.

BCg—39 to 50 inches; light gray (5Y 6/1) silty clay loam; many medium prominent yellowish brown (10YR

5/4) and brownish yellow (10YR 6/8) mottles; weak medium prismatic structure; firm; few faint very dark gray (10YR 3/1) clay films lining pores; many medium stains on faces of peds (iron and manganese oxides); neutral; clear smooth boundary.

Cg—50 to 60 inches; light gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure; firm; common faint black (10YR 2/1) organic films in krotovinas; common fine stains along vertical cracks (iron and manganese oxides); neutral.

The solum ranges from 45 to 60 inches in thickness. The mollic epipedon ranges from 10 to 24 inches in thickness.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5YR, or 5Y, value of 3 to 6, and chroma of 1 or 2. It ranges from medium acid to neutral. The clay content ranges from 35 to 42 percent in the control section. The Cg horizon has hue of 10YR, 2.5YR, or 5Y, value of 5 or 6, and chroma of 1 to 8. It is neutral or mildly alkaline.

Elco Series

The Elco series consists of moderately well drained soils on shoulder slopes and side slopes in the uplands. These soils formed in loess and in the underlying loamy glacial till, which has a strongly developed paleosol. Permeability is moderate in the upper part of the solum and moderately slow in the paleosol. Slopes range from 8 to 20 percent.

Elco soils are similar to Assumption, Hickory, and Rozetta soils and commonly are adjacent to Atlas, Hickory, and Rozetta soils. Assumption soils have a surface layer that is thicker and darker than that of the Elco soils. Atlas and Hickory soils are on side slopes below the Elco soils. The somewhat poorly drained Atlas soils are shallower to a very firm layer than the Elco soils. The well drained Hickory soils formed dominantly in loamy glacial till that does not have a paleosol. The moderately well drained Rozetta soils formed entirely in loess. They are on the more gently sloping, upper side slopes and shoulder slopes above the Elco soils.

Typical pedon of Elco silt loam, 15 to 20 percent slopes, eroded, 1,914 feet east and 2,500 feet south of the northwest corner of sec. 35, T. 12 N., R. 4 E.

Ap—0 to 4 inches; mixed dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/4) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; medium acid; abrupt smooth boundary.

Bt1—4 to 11 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—11 to 16 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine angular blocky structure; firm; many faint brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—16 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate very fine and fine angular blocky structure; firm; many distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2Btg1—22 to 35 inches; grayish brown (10YR 5/2) clay loam; many coarse faint dark grayish brown (10YR 4/2) and many fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; firm; many prominent very dark grayish brown (10YR 3/2) clay films on faces of peds; few fine concretions and common fine stains on faces of peds (iron and manganese oxides); medium acid; gradual smooth boundary.

2Btg2—35 to 44 inches; gray (5Y 5/1) clay loam; many fine prominent yellowish brown (10YR 5/8) and many medium faint dark grayish brown (2.5Y 4/2) mottles; moderate medium prismatic structure; firm; many prominent dark grayish brown (10YR 4/2) clay films on faces of peds; many fine stains on faces of peds and few fine and medium concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

2Btg3—44 to 60 inches; gray (5Y 5/1) clay loam; many medium faint dark grayish brown (2.5Y 4/2) and common medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; firm; common thick dark grayish brown (10YR 4/2) clay films on faces of peds; many medium concretions and many fine stains on faces of peds (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 20 to 40 inches.

The Ap horizon has value of 3 or 4 and chroma of 1 or 2. Some pedons have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It ranges from strongly acid to neutral. It is silt loam or silty clay loam. The 2Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 to 4. It is clay loam, silty clay loam, or silty clay. The clay content in the control section is 27 to 35 percent.

Elkhart Series

The Elkhart series consists of well drained, moderately permeable soils on side slopes and at the head of drainageways in the uplands. These soils formed in calcareous loess. Slopes range from 3 to 15 percent.

These soils have a thinner dark surface soil than is definitive for the Elkhart series. This difference, however, does not significantly affect the usefulness or behavior of the soils.

Elkhart soils are similar to Downs, Sylvan, and Tama soils and are commonly adjacent to Tama soils. The moderately well drained Downs and Tama soils have carbonates at a depth of more than 36 inches. Tama soils are higher on the landscape than the Elkhart soils. The well drained Sylvan soils have a surface layer that is thinner or lighter colored than that of the Elkhart soils.

Typical pedon of Elkhart silty clay loam, 5 to 10 percent slopes, eroded, 2,244 feet north and 726 feet west of southeast corner of sec. 15, T. 13 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

Bt1—8 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—19 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct gray (10YR 5/1) mottles; moderate medium subangular blocky structure; friable; common faint dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

BC—28 to 35 inches; yellowish brown (10YR 5/6) silt loam; few fine faint yellowish brown (10YR 5/8) and few fine distinct gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.

C1—35 to 41 inches; yellowish brown (10YR 5/6) silt loam; few fine faint yellowish brown (10YR 5/4) and common fine distinct grayish brown (10YR 5/2) mottles; massive; friable; few fine stains on faces of vertical cracks (iron and manganese oxides); slight effervescence; 13 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

C2—41 to 60 inches; mottled yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) silt loam; few fine faint yellowish brown (10YR 5/8) mottles; massive; friable; few fine stains on faces of vertical cracks (iron and manganese oxides); slight effervescence; 22 percent calcium carbonate equivalent; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 20 to 40 inches. The dark surface layer is 5 to 9 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. It is silty clay loam or silt loam. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It ranges from medium acid to neutral. The clay content in the control section ranges from 10 to 35 percent. The C horizon is mildly alkaline or moderately alkaline.

Fayette Series

The Fayette series consists of well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 2 to 25 percent.

Fayette soils are similar to Downs, Hickory, Rozetta, and Sylvan soils and commonly are adjacent to Hickory, Rozetta, and Sylvan soils. Downs soils have a surface layer that is thicker or darker than that of the Fayette soils. The well drained Hickory soils formed dominantly in loamy glacial till. They are on slopes below the Fayette soils. Rozetta soils have grayish brown mottles in the lower part of the Bt horizon. They are in landscape positions similar to those of the Fayette soils. The well drained Sylvan soils have carbonates within a depth of 40 inches. They commonly are at the head of drainageways below the Fayette soils.

Typical pedon of Fayette silt loam, 2 to 5 percent slopes, 990 feet south and 924 feet east of northwest corner of sec. 18, T. 9 N., R. 3 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; slightly acid; clear smooth boundary.

E1—4 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak thin and medium platy structure; friable; common very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

E2—8 to 11 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak thin platy structure parting to weak very fine subangular blocky; friable; very strongly acid; clear smooth boundary.

BE—11 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

Bt1—16 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; strong fine angular blocky structure; firm; many faint brown (10YR 4/3) clay films on faces of peds; common distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine stains on faces of peds (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt2—25 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many distinct brown (10YR 4/3) clay

films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); very strongly acid; gradual smooth boundary.

Bt3—37 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; common distinct dark yellowish brown (10YR 4/4) clay films and few distinct dark grayish brown (10YR 4/2) silt coatings on faces of peds; few fine stains on faces of peds (iron and manganese oxides); very strongly acid; gradual smooth boundary.

BC—50 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; common faint dark yellowish brown (10YR 4/4) clay films lining channels and pores; few distinct light gray (10YR 7/2) silt coatings on faces of peds; few fine stains on faces of peds (iron and manganese oxides); strongly acid.

The thickness of the solum ranges from 36 to 60 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. The Ap horizon, if it occurs, has hue of 10YR, value of 4, and chroma of 2 or 3. The E horizon has value of 4 or 5 and chroma of 1 to 4. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. Some pedons have a C horizon.

Harvard Series

The Harvard series consists of well drained, moderately permeable soils on stream terraces. These soils formed in loess and in the underlying stratified outwash. Slopes range from 1 to 5 percent.

Harvard soils are similar to Camden and Downs soils and commonly are adjacent to those soils. The moderately well drained Camden soils have a surface layer that is thinner or lighter colored than that of the Harvard soils. They are in landscape positions similar to those of the Harvard soils. The moderately well drained Downs soils formed entirely in loess on uplands and stream terraces.

Typical pedon of Harvard silt loam, 1 to 5 percent slopes, 2,300 feet east and 1,320 feet south of northwest corner of sec. 16, T. 9 N., R. 3 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak thick platy structure parting to weak fine subangular blocky; friable; few very fine roots; few dark yellowish brown (10YR 4/4) fragments of an E horizon in the lower part; neutral; clear smooth boundary.

Bt1—7 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings lining pores; slightly acid; clear smooth boundary.

Bt2—14 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—22 to 32 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt4—32 to 37 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2Bt5—37 to 45 inches; yellowish brown (10YR 5/4) clay loam; weak coarse subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; neutral; abrupt smooth boundary.

2C—45 to 60 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) stratified loam, sandy loam, and loamy sand; massive; very friable; slightly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess layer ranges from 20 to 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. Some pedons have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 to 5. It is medium acid to neutral. The clay content ranges from 27 to 35 percent in the control section. The 2Bt horizon is silt loam, loam, sandy loam, or clay loam or is stratified with a combination of these textures. The 2C horizon is stratified silt loam, loam, sandy loam, or clay loam and has thin layers of loamy sand or sand.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on side slopes in the uplands. These soils formed primarily in loamy glacial till. In some areas, however, the upper part of the solum formed in as much as 20 inches of loess. Slopes range from 10 to 50 percent.

Hickory soils are similar to Fayette soils and commonly are adjacent to Atlas, Fayette, and Marseilles soils. Fayette soils formed entirely in loess on shoulder slopes above the Hickory soils. The somewhat poorly drained Atlas soils have more clay in the control section than the Hickory soils. They are on side slopes above the Hickory soils. Marseilles soils formed dominantly in material weathered from shale and siltstone. They are lower on the landscape than the Hickory soils.

Typical pedon of Hickory loam, 30 to 50 percent slopes, 2,442 feet south and 627 feet west of the northeast corner of sec. 34, T. 12 N., R. 4 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

E—4 to 9 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; common medium faint very dark grayish brown (10YR 3/2) mottles; weak thin platy structure parting to weak medium subangular blocky; friable; strongly acid; clear smooth boundary.

Bt1—9 to 17 inches; brown (10YR 4/3) loam; weak fine and very fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—17 to 24 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; firm; many distinct dark brown (10YR 3/3) clay films on faces of peds; few limestone pebbles; medium acid; clear smooth boundary.

Bt3—24 to 32 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm; many distinct brown (10YR 4/3) clay films on faces of peds; few limestone pebbles; strongly acid; clear smooth boundary.

Bt4—32 to 40 inches; dark yellowish brown (10YR 4/4) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; firm; many distinct brown (10YR 4/3) clay films on faces of peds; common chert and limestone pebbles; strongly acid; clear smooth boundary.

Bt5—40 to 47 inches; yellowish brown (10YR 5/4) clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; common limestone pebbles; neutral; clear smooth boundary.

C—47 to 60 inches; yellowish brown (10YR 5/4) loam; few fine faint yellowish brown (10YR 5/6) mottles; massive; friable; few faint brown (10YR 4/3) clay films lining pores; common limestone pebbles; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to carbonates typically is the same as the thickness of the solum. The loess layer, if it occurs, is as much as 20 inches thick.

The A horizon has value of 2 to 4. It is loam, silt loam, or clay loam. The E horizon has value of 4 to 6 and chroma of 2 to 4. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is very strongly acid to medium acid. It is clay loam or silty clay loam. The clay content in the control section ranges from 25 to 35 percent and the sand content from 15 to 45 percent. The C horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2 to 4. It is clay loam, loam, or sandy loam.

Huntsville Series

The Huntsville series consists of well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Huntsville soils commonly are adjacent to Lawson and Sawmill soils. The adjacent soils are lower on the landscape than the Huntsville soils. Lawson soils are somewhat poorly drained. Sawmill soils are poorly drained.

Typical pedon of Huntsville silt loam, 2,475 feet east and 495 feet south of northwest corner of sec. 1, T. 12 N., R. 4 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

A1—10 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A2—16 to 27 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

AC—27 to 52 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

C—52 to 60 inches; dark brown (10YR 3/3) silt loam; massive; friable; slightly acid.

The thickness of the solum ranges from 24 to 40 inches. It is the same as the thickness of the mollic epipedon.

The upper part of the A horizon has value of 2 or 3 and chroma of 1 or 2. The lower part has chroma of 1 to 3. The AC horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 3 to 5.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 0 to 3 percent.

Ipava soils are similar to Clarksdale and Tama soils and commonly are adjacent to Sable and Tama soils. Clarksdale soils do not have a mollic epipedon. Sable soils have less clay in the control section than the Ipava soils. They are subject to ponding, are poorly drained, and are on the lower parts of the uplands. Tama soils have less clay in the control section than the Ipava soils. They are moderately well drained and are in the more sloping areas on the higher parts of the landscape.

Typical pedon of Ipava silt loam, 0 to 3 percent slopes, 2,046 feet west and 594 feet north of the southeast corner of sec. 25, T. 13 N., R. 2 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; friable; medium acid; abrupt smooth boundary.

A—10 to 18 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; common thin black (10YR 2/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

BA—18 to 24 inches; brown (10YR 4/3) silty clay loam; few fine faint light brownish gray (2.5Y 6/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common thin very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt—24 to 31 inches; dark grayish brown (10YR 4/2) silty clay; few fine faint light brownish gray (2.5Y 6/2) and common fine prominent yellowish brown (10YR 5/8) mottles; moderate fine prismatic structure parting to weak fine subangular blocky; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg—31 to 37 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine faint light brownish gray (2.5Y 6/2) and common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine concretions and few fine stains on faces of peds (iron and manganese oxides); neutral; gradual smooth boundary.

BCg—37 to 50 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine faint light brownish gray (2.5Y 6/2) and common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few distinct very dark grayish brown (10YR 3/2) clay films lining pores; few fine concretions and common fine stains on faces of peds (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Cg—50 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/8) mottles; massive; friable; few faint very dark grayish brown (10YR 3/2) clay films lining pores; few fine concretions and few fine stains along vertical cracks (iron and manganese oxides); moderately alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the mollic epipedon ranges from 14 to 24 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. They range from medium acid to neutral. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. It is silty clay loam or silty clay. It has a clay content of 35 to 43 percent in the control section. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4.

Keomah Series

The Keomah series consists of somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Keomah soils are similar to Clarksdale, Ipava, and Rozetta soils and commonly are adjacent to Clarksdale and Rozetta soils. Clarksdale soils have a surface layer that is thicker or darker than that of the Keomah soils. They are in landscape positions similar to those of the Keomah soils. Ipava soils have a mollic epipedon and do not have a brown subsurface layer. Rozetta soils have less clay in the control section than the Keomah soils. They are moderately well drained and are on the steeper slopes below the Keomah soils.

Typical pedon of Keomah silt loam, 2,440 feet west and 200 feet north of the southeast corner of sec. 26, T. 12 N., R. 3 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; neutral; clear smooth boundary.

E—6 to 12 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; few fine distinct light gray (10YR 7/2) mottles; moderate medium and thick platy structure parting to weak very fine subangular blocky; friable; common fine and few medium concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt1—12 to 14 inches; brown (10YR 4/3) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; weak medium angular blocky structure; friable; few distinct dark grayish brown (10YR 4/2) clay films and common faint light gray (10YR 7/2) silt coatings on faces of peds; common fine stains on faces of

peds (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt2—14 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium angular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); medium acid; clear smooth boundary.

Btg1—17 to 26 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to strong medium angular blocky; firm; many distinct thick grayish brown (2.5Y 5/2) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); medium acid; clear smooth boundary.

Btg2—26 to 38 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/8) and common fine faint brown (10YR 4/3) mottles; weak medium prismatic structure parting to weak medium angular blocky; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Btg3—38 to 48 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and many medium distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) clay films lining root channels; many fine concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Cg—48 to 60 inches; dark grayish brown (2.5Y 4/2) silt loam; many medium prominent yellowish brown (10YR 5/6) and many medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; many fine concretions (iron and manganese oxides); strong effervescence; 8 percent calcium carbonate equivalent in the lower 6 inches; moderately alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 to 3. The upper part of the Bt horizon has value of 4 or 5 and chroma of 2 to 4. Chroma of 2 becomes dominant as depth increases. The Bt horizon is silty clay loam or silty clay. It has a clay content of 36 to 42 percent in the control section. The C horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4.

Lawson Series

The Lawson series consists of somewhat poorly drained, moderately permeable soils on flood plains and in upland drainageways. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Lawson soils are similar to Radford and Sawmill soils and commonly are adjacent to Huntsville and Sawmill soils. Huntsville soils are well drained and are slightly higher on the landscape and nearer the streams than the Lawson soils. Radford soils have a dark colored buried soil within a depth of 40 inches. Sawmill soils are poorly drained and are lower on the landscape than the Lawson soils.

Typical pedon of Lawson silt loam, 825 feet west and 1,320 feet south of the northeast corner of sec. 8, T. 9 N., R. 3 E.

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

A1—12 to 21 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; common faint black (10YR 2/1) and very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

A2—21 to 31 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

C1—31 to 42 inches; stratified dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) and few fine distinct strong brown (7.5YR 5/8) mottles; weak fine and medium subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine stains on faces of peds (iron and manganese oxides); neutral; clear smooth boundary.

C2—42 to 60 inches; stratified very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2), and brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) and few fine prominent strong brown (7.5YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) organic coatings lining pores; few fine concretions (iron and manganese oxides); neutral.

The mollic epipedon ranges from 24 to 36 inches in thickness. The A horizon has value of 2 or 3 and chroma of 1 or 2. The clay content in the control section ranges from 18 to 30 percent. The C horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3.

Lenzburg Series

The Lenzburg series consists of well drained, moderately slowly permeable soils formed in a regolith in surface-mined areas on uplands. The regolith is a mixture of fine-earth material and fragments of bedrock. Slopes range from 1 to 70 percent.

Lenzburg soils are similar to Rapatee soils and commonly are adjacent to Atlas, Elco, Hickory, and Marseilles soils. Rapatee soils are fine-silty and have a moist value of 2 or 3 in the upper 10 to 30 inches. Atlas and Elco soils formed in loess and in the underlying loamy glacial till, which has a strongly developed paleosol. They are more poorly drained than the Lenzburg soils. The well drained Hickory soils formed dominantly in loamy glacial till. The well drained Marseilles soils formed dominantly in material weathered from shale and siltstone. All the adjacent soils are in unmined areas on side slopes along drainageways.

Typical pedon of Lenzburg silty clay loam, 1 to 7 percent slopes, 165 feet east and 2,211 feet south of northwest corner of sec. 29, T. 9 N., R. 4 E.

Ap—0 to 2 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; weak very fine subangular blocky structure; friable; common distinct roots; common shale channers (about 10 percent by volume); neutral; clear smooth boundary.

C1—2 to 17 inches; about 60 percent grayish brown (2.5Y 5/2) and 40 percent yellowish brown (10YR 5/6) silty clay loam; massive with weak fine subangular blocky structure parting to weak medium granular in fragments of genetic horizons; firm; few fine roots; common distinct black (N 2/0) organic coatings on faces of the fragments of genetic horizons; about 15 percent shale channers by volume; slight effervescence; mildly alkaline; gradual smooth boundary.

C2—17 to 60 inches; about 50 percent brown (10YR 4/3) and 50 percent yellowish brown (10YR 5/6) channery loam; many medium distinct light brownish gray (10YR 6/2) mottles; massive with weak coarse subangular blocky structure in fragments of genetic horizons; very firm; very few fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of the fragments of genetic horizons; about 25 percent shale and siltstone channers by volume; slight effervescence; about 8 percent calcium carbonate equivalent; mildly alkaline.

The fine-earth material has a few fragments of genetic horizons. The rock fragments are commonly soft shale and siltstone, but some are sandstone or limestone. The content of rock fragments in the control section ranges from 10 to 35 percent by volume. Most of the fragments range from 2 millimeters to 15 centimeters in diameter, but some are much larger stones and boulders.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 1 to 4. It ranges from neutral to moderately alkaline. It is channery loam, loam, clay loam, silt loam, or silty clay loam. The content of rock fragments in this horizon ranges from 10 to 25 percent by volume. A few stones are on the surface. The C horizon has hue of 10YR, 2.5Y, 5Y, or 5G or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 6. Many of the colors are relict and are not indicative of soil drainage. The C horizon is loam, clay loam, silt loam, silty clay loam, silty clay, or the channery or gravelly analogs of these textures. The content of rock fragments in this horizon ranges from 15 to 35 percent by volume.

Littleton Series

The Littleton series consists of somewhat poorly drained, moderately permeable soils on stream terraces. These soils formed in silty alluvium. Slopes range from 1 to 3 percent.

Littleton soils are commonly adjacent to Sawmill soils. Sawmill soils are poorly drained and are on the less sloping, lower parts of flood plains.

Typical pedon of Littleton silt loam, 1 to 3 percent slopes, 950 feet west and 1,735 feet south of the northeast corner of sec. 30, T. 9 N., R. 3 E.

Ap—0 to 6 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

A—6 to 19 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

AB—19 to 32 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine subangular blocky structure; friable; common faint dark brown (10YR 3/3) coatings of very fine sand on faces of peds; few fine stains on faces of peds (iron oxide); neutral; clear smooth boundary.

Bw1—32 to 38 inches; brown (10YR 4/3) silt loam; common fine faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; common faint dark grayish brown (10YR 4/2) clay films lining root channels and pores; neutral; clear smooth boundary.

Bw2—38 to 49 inches; brown (10YR 5/3) silt loam; few fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine concretions and few fine stains on faces of peds (iron and manganese oxides); mildly alkaline; gradual smooth boundary.

C—49 to 60 inches; brown (10YR 5/3) silt loam; few thin sand lenses below a depth of 55 inches; few fine

faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine concretions (iron and manganese oxides); mildly alkaline.

The solum ranges from 40 to 50 inches in thickness. It is slightly acid to mildly alkaline. The thickness of the mollic epipedon ranges from 24 to 40 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. The B horizon has value of 3 to 5 and chroma of 2 or 3. The clay content in the control section ranges from 18 to 24 percent. The C horizon has value of 4 to 6 and chroma of 1 to 3.

Marseilles Series

The Marseilles series consists of well drained, slowly permeable soils on upland side slopes. These soils are moderately deep over bedrock. They formed in material weathered from shale and siltstone. Slopes range from 10 to 60 percent.

Marseilles soils commonly are adjacent to Atlas, Elco, Fayette, and Hickory soils. The somewhat poorly drained Atlas and moderately well drained Elco soils formed in loess and loamy glacial till, which has a paleosol. They are on the less sloping parts of the landscape above the Marseilles soils. Fayette soils formed in loess on shoulder slopes above the Marseilles soils. Hickory soils formed dominantly in loamy glacial till. They are in landscape positions similar to those of the Marseilles soils.

Typical pedon of Marseilles silt loam, 30 to 60 percent slopes, 750 feet east and 132 feet south of the northwest corner of sec. 27, T. 12 N., R. 4 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; few very fine and fine roots along faces of peds; few shale and siltstone channers; strongly acid; clear smooth boundary.

BA—6 to 9 inches; yellowish brown (10YR 5/4) silty clay loam; weak very fine and fine angular blocky structure; friable; few very fine and fine roots along faces of peds; few shale and siltstone channers; very strongly acid; clear smooth boundary.

Bt1—9 to 14 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine angular blocky structure; friable; few very fine roots along faces of peds; common distinct brown (10YR 4/3) clay films on faces of peds; common shale and siltstone channers; very strongly acid; clear smooth boundary.

Bt2—14 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium angular blocky structure; firm; few very fine roots along vertical faces of peds; common distinct brown (10YR 4/3) clay films on faces of peds; common light brownish gray (2.5Y 6/2) shale and siltstone channers; very strongly acid; gradual smooth boundary.

Bt3—22 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; firm; few distinct brown (10YR 4/3) clay films on faces of peds; common light brownish gray (2.5Y 6/2) shale and siltstone channers; very strongly acid; gradual smooth boundary.

BC—27 to 34 inches; olive (5Y 5/3) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium platy structure; very firm; many light brownish gray (2.5Y 6/2) shale and siltstone channers; very strongly acid; clear smooth boundary.

Cr—34 to 60 inches; olive (5Y 5/3) and light brownish gray (2.5Y 6/2) shale and siltstone; few fine and medium prominent yellowish brown (10YR 5/4) mottles; weak thick platy rock structure; extremely firm; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. It commonly is the same as the depth to bedrock.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is silt loam or silty clay loam. Some pedons have a weakly expressed E horizon. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 2 to 4. It ranges from slightly acid to very strongly acid. It is clay loam, silt loam, silty clay loam, or silty clay. The clay content in the control section ranges from 24 to 35 percent. The Cr horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 4.

Orion Series

The Orion series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium overlying an older buried soil. Slopes range from 0 to 2 percent.

These soils have more clay in the control section than is definitive for the Orion series. This difference, however, does not significantly affect the usefulness or behavior of the soils.

Orion soils are similar to Lawson and Radford soils and commonly are adjacent to Lawson and Sawmill soils. Lawson and Radford soils have a mollic epipedon. Lawson soils are in landscape positions similar to those of the Orion soils. Sawmill soils are poorly drained, have a mollic epipedon, and are in the slightly lower landscape positions.

Typical pedon of Orion silt loam, 2,492 feet east and 828 feet north of southwest corner of sec. 33, T. 12 N., R. 3 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak

medium subangular blocky structure parting to moderate fine granular; friable; mildly alkaline; clear smooth boundary.

C1—5 to 17 inches; dark brown (10YR 4/3) silt loam; few fine distinct light brownish gray (2.5Y 6/2) mottles; weak fine subangular blocky structure; friable; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; strata of light gray (10YR 7/2) silt in the lower part; mildly alkaline; gradual smooth boundary.

C2—17 to 29 inches; brown (10YR 5/3) silt loam; few fine faint light brownish gray (10YR 6/2) mottles; weak very fine subangular blocky structure; friable; thin strata of very dark gray (10YR 3/1) organic matter in the lower part; mildly alkaline; abrupt smooth boundary.

Ab1—29 to 42 inches; very dark gray (10YR 3/1) silty clay loam; common fine faint dark brown (10YR 4/3) mottles; moderate medium granular structure; friable; mildly alkaline; clear smooth boundary.

Ab2—42 to 57 inches; very dark gray (10YR 3/1) silty clay loam; few fine prominent dark brown (7.5YR 4/4) mottles; moderate fine and medium angular blocky structure; firm; few fine stains on faces of peds (iron and manganese oxides); neutral; clear smooth boundary.

C —57 to 60 inches; dark gray (10YR 4/1) silt loam; common fine prominent dark brown (7.5YR 4/4) mottles; weak medium prismatic structure; firm; few fine stains on faces of peds (iron and manganese oxides); slightly acid.

The depth to the Ab horizon ranges from 20 to 40 inches. The Ap horizon and the upper C horizon have value of 4 or 5 and chroma of 2 or 3. The clay content in the control section ranges from 18 to 26 percent. The Ab horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is silt loam or silty clay loam. The lower C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

Radford Series

The Radford series consists of somewhat poorly drained, moderately permeable soils on flood plains and in upland drainageways. These soils formed in silty alluvium overlying an older buried soil. Slopes range from 0 to 2 percent.

Radford soils are similar to Lawson, Orion, and Sawmill soils and commonly are adjacent to Assumption, Lawson, Sawmill, and Tama soils. Assumption and Tama soils are better drained than the Radford soils and are higher on the upland slopes. Lawson soils do not have a buried soil. They are in landscape positions similar to those of the Radford soils. Orion soils do not have a mollic epipedon. Sawmill soils are poorly drained, have a mollic epipedon that is more than 24 inches thick, and are slightly lower on the landscape than the Radford soils.

Typical pedon of Radford silt loam, 1,617 feet west and 132 feet north of southeast corner of sec. 17, T. 13 N., R. 2 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

A—9 to 20 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to weak fine and medium granular; friable; few faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

C—20 to 26 inches; very dark gray (10YR 3/1) silt loam; thin yellowish brown (10YR 5/4) strata; thick strata with weak fine and medium granular structure; friable; slightly acid; abrupt smooth boundary.

Ab1—26 to 31 inches; black (10YR 2/1) silty clay loam; weak fine subangular blocky structure parting to weak fine and medium granular; friable; mildly alkaline; clear smooth boundary.

Ab2—31 to 47 inches; black (10YR 2/1) silty clay loam; weak coarse prismatic structure parting to weak medium angular blocky; firm; few fine threadlike stains (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Ab3—47 to 60 inches; black (10YR 2/1) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak medium angular blocky structure; firm; mildly alkaline.

The mollic epipedon ranges from 10 to 24 inches in thickness. The depth to the buried soil ranges from 20 and 40 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The C horizon has value of 2 to 6 and chroma of 1 or 2. The buried soil has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 5 and chroma 0 to 2. It is silty clay loam, clay loam, or silt loam.

Rapatee Series

The Rapatee series consists of well drained, very slowly permeable soils. These soils formed in silty material over a regolith in surface-mined areas. The silty material was replaced after the areas were mined. The regolith is a mixture of fine-earth material and fragments of bedrock. Slopes range from 1 to 7 percent.

Rapatee soils are similar to Lenzburg soils and commonly are adjacent to Ipava, Sable, and Tama soils. Lenzburg soils do not have a moist value of 2 or 3 in the upper 10 to 30 inches. They have more sand in the control section than the Rapatee soils. Ipava, Sable, and

Tama soils are more poorly drained than the Rapatee soils, formed in loess, and are in undisturbed areas.

Typical pedon of Rapatee silty clay loam, 1 to 7 percent slopes, 1,460 feet west and 2,300 feet north of the southeast corner of sec. 11, T. 12 N., R. 3 E.

Ap—0 to 3 inches; mixed black (10YR 2/1) and very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) and gray (10YR 5/1) dry; moderate very fine subangular blocky structure; friable; common fine and very fine roots; mixed with some natural subsoil material and horizontal strata of yellowish brown (10YR 5/4 and 5/8) and grayish brown (10YR 5/2) material; slightly acid; clear smooth boundary.

C1—3 to 18 inches; mixed black (10YR 2/1) and very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) and gray (10YR 5/1) dry; massive; firm; common fine roots; moderate medium and coarse clods or soil fragments; mixed with some natural subsoil material and horizontal strata of yellowish brown (10YR 5/4 and 5/8) and grayish brown (10YR 5/2) material; few fine stains on faces of soil fragments along vertical cracks; few fine concretions (iron and manganese oxides); slightly acid; abrupt wavy boundary.

C2—18 to 48 inches; mixed dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) silty clay loam; dominantly massive but some very weak coarse subangular blocky clods and soil fragments; very dense; very firm; few pockets of dark olive gray (5Y 3/2) silty clay loam; common fine and medium rounded concretions (iron and manganese oxides); mildly alkaline; abrupt wavy boundary.

C3—48 to 60 inches; mixed brown (10YR 4/3), yellowish brown (10YR 5/4 and 5/6), and greenish gray (5G 5/1) clay loam; dominantly massive but some very weak coarse subangular blocky structure in the remnant fragments of the diagnostic horizons; extremely dense; very firm; very few distinct dark brown (10YR 3/3) clay films on faces of peds of the remnant fragments; common fine and medium stains along vertical cracks; common medium concretions (iron and manganese oxides); common coarse and medium fragments of coal and shale; common dolomitic limestone till pebbles; strong effervescence; mildly alkaline.

The dark silty material in the Ap and C1 horizons ranges from 10 to 30 inches in thickness. These horizons have value of 2 or 3 and chroma of 1 to 3. They are silt loam or silty clay loam. They are slightly acid or neutral. Some pedons do not have an Ap horizon.

The C2 and 2C horizons have hue of 10YR, 2.5Y, 5Y, 5G, 5GY, or 5GB, value of 4 to 6, and chroma of 1 to 8. Colors are mixed throughout. The C2 horizon is silt loam or silty clay loam. The content of rock fragments in this horizon ranges from 0 to 10 percent by volume. The 2C horizon is loam, clay loam, silt loam, silty clay loam, or the channery analogs of these textures. The content of rock fragments in this horizon ranges from 10 to 30 percent by volume. The rock fragments are commonly soft shale and siltstone, but some are sandstone and limestone. The clay content in the control section ranges from 22 to 35 percent. In some pedons the C2 and 2C horizons have some blocks of natural soil material. They range from neutral to moderately alkaline. The lower part of the 2C horizon typically contains free carbonates.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slopes range from 1 to 10 percent.

Rozetta soils are similar to Elco, Fayette, and Sylvan soils and commonly are adjacent to those soils. Elco soils formed in loess and in the underlying glacial till paleosol. They commonly are on the steeper side slopes below the Rozetta soils. Fayette soils are well drained and do not have mottles in the part of the Bt horizon within a depth of 30 inches. The well drained Sylvan soils have carbonates within a depth of 40 inches. They commonly are near the head of drainageways.

Typical pedon of Rozetta silt loam, 1 to 5 percent slopes, 1,089 feet west and 2,444 feet north of the southeast corner of sec. 33, T. 12 N., R. 3 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine and fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

Bt1—9 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—13 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong fine and medium angular blocky structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—18 to 28 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium prismatic structure parting to strong medium angular blocky; firm; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt4—28 to 40 Inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few distinct gray (10YR 6/1) silt coatings and

common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt5—40 to 53 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct light brownish gray (10YR 6/2) and common fine faint yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine stains on faces of peds; few fine concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

C—53 to 60 inches; mottled yellowish brown (10YR 5/4 and 5/6) and light brownish gray (10YR 6/2) silt loam; massive; friable; common fine stains along vertical cracks; common fine concretions (iron and manganese oxides); neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The Ap horizon has value of 3 or 4 and chroma of 2 or 3. Some pedons have an E horizon. This horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The clay content in the control section ranges from 27 to 35 percent. The C horizon has value of 4 to 6 and chroma of 2 to 6.

Sable Series

The Sable series consists of poorly drained, moderately permeable soils in swales and on flats in the uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Sable soils are similar to Edinburg soils and commonly are adjacent to Ipava and Tama soils. Edinburg and Ipava soils have more clay in the control section than the Sable soils. The somewhat poorly drained Ipava and moderately well drained Tama soils are on the higher, more sloping parts of the landscape above the Sable soils.

Typical pedon of Sable silty clay loam 2,475 feet east and 30 feet south of the northwest corner of sec. 33, T. 13 N., R. 2 E.

Ap—0 to 6 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate medium granular; friable; neutral; clear smooth boundary.

A—6 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine angular blocky structure; friable; neutral; clear smooth boundary.

AB—14 to 21 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; many faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Btg1—21 to 28 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; many distinct very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

Btg2—28 to 36 inches; gray (5Y 5/1) silty clay loam; few fine prominent brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate very fine angular blocky; firm; common distinct very dark gray (10YR 3/1) clay films on faces of peds; mildly alkaline; clear smooth boundary.

Btg3—36 to 44 inches; gray (5Y 5/1) silty clay loam; few medium faint light gray (5Y 7/2) and few fine prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; firm; common distinct dark gray (5Y 4/1) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); mildly alkaline; gradual smooth boundary.

Cg—44 to 60 inches; light gray (5Y 6/1) silt loam; few medium faint light gray (5Y 7/2) and common medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few distinct dark gray (5Y 4/1) organic films lining pores and root channels; few fine stains along vertical cracks; few fine concretions (iron and manganese oxides); slight effervescence; mildly alkaline.

The solum ranges from 40 to 66 inches in thickness. The mollic epipedon ranges from 12 to 24 inches in thickness.

The A horizon has hue of 10YR or is neutral in hue. It has value or 2 or 3 and chroma of 0 or 1. It is medium acid to neutral. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The clay content in the control section ranges from 27 to 35 percent. The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains and in upland drainageways. These soils formed in silty alluvium. Slopes are 0 to 1 percent.

Sawmill soils are similar to Lawson and Radford soils and commonly are adjacent to Dorchester, Huntsville, and Lawson soils. The adjacent soils are in the slightly higher landscape positions. Dorchester soils are well drained, do not have a mollic epipedon, and have thin strata of calcareous silty material throughout. Huntsville soils are well drained. Lawson and Radford soils are somewhat poorly drained.

Typical pedon of Sawmill silty clay loam, overwash, 2,640 feet west and 30 feet north of the southeast corner of sec. 14, T. 10 N., R. 3 E.

Ap—0 to 13 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; some thin brown (10YR 5/3) strata; weak medium subangular blocky structure; firm; mildly alkaline; gradual smooth boundary.

A1—13 to 25 inches; very dark gray (N 3/0) silty clay loam, dark gray (N 4/0) dry; weak medium subangular blocky structure; firm; few fine stains on faces of peds (iron and manganese oxides); neutral; gradual smooth boundary.

A2—25 to 33 inches; very dark gray (N 3/0) silty clay loam, dark gray (N 4/0) dry; common fine prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; neutral; gradual smooth boundary.

AB—33 to 38 inches; black (5Y 2/1) silty clay loam, dark gray (5Y 4/1) dry; few fine prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; few fine stains on faces of peds (iron and manganese oxides); neutral; abrupt smooth boundary.

Bg1—38 to 46 inches; dark gray (N 4/0) silty clay loam; many fine and medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure; firm; neutral; abrupt smooth boundary.

Bg2—46 to 54 inches; dark gray (N 4/0) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; mildly alkaline; gradual smooth boundary.

Cg—54 to 60 inches; gray (N 5/0) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; massive; friable; mildly alkaline.

The solum ranges from 36 to 60 inches in thickness. It is slightly acid to moderately alkaline. The overwash material is 10 to 18 inches thick. The mollic epipedon is 24 to 36 inches thick.

The A horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The Bg horizon has hue of 10YR, 2.5Y or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 2 or less. It is silty clay loam or clay loam. The Cg horizon is silty clay loam or clay loam that has thin strata containing more sand in some pedons.

Sylvan Series

The Sylvan series consists of well drained, moderately permeable soils on uplands. These soils formed in calcareous loess. Slopes range from 5 to 15 percent.

Sylvan soils are similar to Elkhart, Fayette, and Rozetta soils and commonly are adjacent to Fayette and Rozetta soils. Elkhart soils have a surface layer that is thicker or darker than that of the Sylvan soils. Fayette soils and the moderately well drained Rozetta soils have carbonates at a depth of more than 40 inches. They are in landscape positions similar to those of the Sylvan soils.

Typical pedon of Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded, 467 feet east and 99 feet north of the southwest corner of sec. 35, T. 12 N., R. 3 E.

Ap—0 to 8 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; medium acid; clear smooth boundary.

Bt1—8 to 13 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine angular blocky structure; friable; common faint brown (10YR 4/3) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); medium acid; clear smooth boundary.

Bt2—13 to 27 inches; brown (10YR 5/3) silty clay loam; many medium and coarse faint light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); slight effervescence; mildly alkaline; clear smooth boundary.

C1—27 to 40 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; common fine concretions (iron and manganese oxides); few medium concretions (calcium carbonate); slight effervescence; moderately alkaline; clear smooth boundary.

C2—40 to 60 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) silt loam; massive; friable; few fine stains on faces of vertical cracks (iron and manganese oxides); few fine concretions (calcium carbonate); strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 22 to 35 inches. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 5. The clay content in the control section ranges from 25 to 35 percent. The light brownish gray mottles in the Bt2 horizon are probably relict colors. The C horizon has hue of 10YR or 2.5Y, value or 4 to 6, and chroma of 2 to 6.

Tama Series

The Tama series consists of moderately well drained, moderately permeable soils on uplands and stream

terraces. These soils formed in loess. Slopes range from 1 to 15 percent.

Tama soils are similar to Assumption, Downs, Elkhart, and Rozetta soils and commonly are adjacent to Assumption, Downs, and Elkhart soils. Assumption soils formed in loess and in the underlying glacial till. They are downslope from the Tama soils. Downs and Rozetta soils have a surface layer that is thinner or lighter colored than that of the Tama soils. Also, they are nearer drainageways and streams. The well drained Elkhart soils have carbonates within a depth of 40 inches. They are at the head of drainageways.

Typical pedon of Tama silt loam, 1 to 4 percent slopes, 165 feet east and 1,221 feet south of northwest corner of sec. 14, T. 13 N., R. 2 E.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

A—9 to 13 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate very fine and fine subangular blocky structure; friable; medium acid; clear smooth boundary.

Bt1—13 to 20 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—20 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; few distinct black (10YR 2/1) organic films lining root channels; medium acid; clear smooth boundary.

Bt3—31 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; few fine and medium faint yellowish brown (10YR 5/8) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; common faint brown (10YR 4/3) clay films on faces of peds; few fine stains on faces of peds (iron and manganese oxides); neutral; clear smooth boundary.

BC—41 to 47 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/8) mottles; weak fine prismatic structure; friable; few distinct very dark grayish brown (10YR 3/2) organic films lining root channels; few fine stains on faces of peds (iron and manganese oxides); neutral; clear smooth boundary.

C—47 to 60 inches; yellowish brown (10YR 5/6) silt loam; many fine and medium distinct gray (10YR 5/1), common fine faint yellowish brown (10YR 5/4), and common fine distinct strong brown (7.5YR 5/8) mottles; massive; friable; few fine stains on faces of vertical cracks (iron and manganese oxides); moderately alkaline.

The solum ranges from 40 to more than 60 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is silt loam or silty clay loam. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The clay content in the control section ranges from 27 to 35 percent. The C horizon has value of 4 or 5 and chroma of 3 to 6.

Tama silty clay loam, 2 to 5 percent slopes, eroded, Tama silty clay loam, 5 to 10 percent slopes, eroded, Tama silty clay loam, 10 to 15 percent slopes, eroded, and the Tama soil in the Tama-Urban land complex, 3 to 10 percent slopes, have a dark surface soil that is thinner than is definitive for the Tama series. This difference, however, does not significantly affect the usefulness or behavior of the soils.

Virgil Series

The Virgil series consists of somewhat poorly drained, moderately permeable soils on stream terraces. These soils formed in loess and in the underlying stratified loamy outwash. Slopes range from 0 to 2 percent.

Virgil soils are similar to Clarksdale and Keomah soils and commonly are adjacent to Camden, Harvard, and Sawmill soils. Clarksdale and Keomah soils formed entirely in loess and have more clay in the control section than the Virgil soils. Camden and Harvard soils are moderately well drained and well drained, are shallower to loamy sediments than the Virgil soils, and are on the higher, more sloping parts of the landscape. Sawmill soils are poorly drained, formed in alluvium, and are lower on the landscape than the Virgil soils.

Typical pedon of Virgil silt loam, 1,100 feet west and 1,640 feet south of the northeast corner of sec. 12, T. 10 N., R. 3 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; very few fine roots; slightly acid; clear smooth boundary.

E—8 to 13 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to moderate medium granular; friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds and lining pores; very few very fine roots; slightly acid; clear smooth boundary.

Bt1—13 to 19 inches; brown (10YR 4/3) silt loam; many fine faint dark grayish brown (10YR 4/2) and few medium faint yellowish brown (10YR 5/4) mottles; moderate fine and medium subangular blocky structure; friable; common distinct dark gray (10YR 4/1) clay films on faces of peds; few fine

concretions (iron and manganese oxides); very few very fine roots; slightly acid; gradual smooth boundary.

Bt2—19 to 38 inches; brown (10YR 5/3) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine concretions (iron and manganese oxides); very few very fine roots; medium acid; clear smooth boundary.

Bt3—38 to 47 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse angular blocky structure; friable; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; common fine stains on faces of peds; few fine concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2Bt4—47 to 55 inches; dark yellowish brown (10YR 4/4) loam; common fine and medium distinct grayish brown (10YR 5/2) and many fine and medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; friable; few faint gray (10YR 5/1) clay films lining root channels; common fine stains on faces of peds; common fine concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2C—55 to 60 inches; dark yellowish brown (10YR 4/4) stratified silt loam, loam, and clay loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; friable; common fine stains on faces of peds; few fine concretions (iron and manganese oxides); slightly acid.

The solum ranges from 42 to more than 60 inches in thickness. It is strongly acid to neutral. The loess layer ranges from 40 to 60 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The clay content in the control section ranges from 27 to 35 percent. The 2B horizon is loam, silt loam, or clay loam. The 2C horizon is stratified silt loam, loam, clay loam, and sandy loam.

Formation of the Soils

Dr. Leon Follmer, associate geologist, Illinois State Geological Survey, helped prepare this section.

Soil forms through processes that act on deposited or accumulated geologic material. The soil characteristics at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil formed; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the parent material.

Climate and plant and animal life are the active factors of soil formation. They act directly on the parent material either in place or after relocation by water, glaciers, or wind and slowly change it into a natural body that has genetically related horizons. Relief can modify the effects of climate and plant and animal life by inhibiting soil formation on eroded slopes and in wet depressions or nearly level areas. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil that has differentiated horizons. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless the effects of the other factors are understood.

Parent Material

Parent material is the geologic material in which a soil forms. Most of the parent materials in Knox County are a direct result of glaciers and sediments of the Wisconsinan and Illinoian Stages (*15*). Although the parent materials are all of glacial origin, their properties vary greatly, depending on the method of deposition. The dominant parent materials in the county are glacial till, glacial outwash, alluvium, and loess. In dissected areas where the overlying deposits have been removed, the soils formed in material weathered from shale and siltstone. In recent times surface mining has created a new parent material.

Glacial till is material laid down directly by glaciers with a minimum of water action. It consists of particles of different sizes mixed together. The small pebbles in glacial till generally have distinct edges and corners, indicating that they have not been subject to intense washing by water. The glacial till in Knox County was deposited during the Illinoian Stage. It is generally loam or clay loam. Soils that formed in this material generally are on strongly sloping to very steep side slopes. An example is Hickory soils.

In some areas a very firm layer higher in content of clay is in the upper few feet of the Illinoian till. This is a paleosol, which formed during the Sangamonian Stage, between the Illinoian and Wisconsinan Stages (*15*). During the Sangamonian Stage, the glacial till was the surface deposit. It was subject to soil-forming processes. During the Wisconsinan Stage, these soils were buried by loess deposits. Atlas and Assumption are examples of soils that formed in a thin layer of loess and in the underlying till that has a paleosol.

Loess was deposited directly by the wind. It consists of very uniform, calcareous, silt-sized particles. In Knox County the major source of this loess was the Mississippi River Valley, although many smaller streams also could have been sources. These sediments were exposed to the wind when rivers swollen with glacial meltwater from the Wisconsinan glaciers dried seasonally and the glaciers retreated. Since the sediments in the river valleys were exposed, the predominantly northeasterly winds picked up the loess and transported it many miles. The loess covered the Illinoian till in a relatively uniform layer. In Knox County the loess ranges from 7 to 16 feet in thickness, thinning from the northeast to the southwest (*13*). Most of the upland soils in this county formed in loess. Examples are Ipava, Fayette, Sable, and Tama soils.

Outwash was deposited by running water from melting glaciers. The size of the particles that make up outwash varies according to the speed of the streams that carried them. When the water slowed down, the coarser textured material was deposited first. The finer particles were carried a greater distance by more slowly moving water. Outwash deposits in Knox County generally occur as layers of loamy sand, sandy loam, and loam. Most of the areas of outwash have been covered by loess. Camden and Harvard are examples of soils that formed in loess and in the underlying outwash. They are predominantly in the valley along the Spoon River, where waterflow has been concentrated.

Some outwash has been reworked and translocated by the wind after the initial deposition. These areas are on side slopes in the major river valleys. Alvin soils are

an example of soils that formed in sandy windblown material.

Alluvial sediments were deposited mainly during periods of stream overflow. They generally have a silty texture, which indicates that uplands were the source of the sediments. The alluvial areas are throughout the county. Their width ranges for 1 1/2 miles along the Spoon River to less than 1/8 mile along the minor streams. In some areas the sediments have buried horizons of darker soil material.

Pennsylvanian shale, sandstone, and siltstone underlie most of the unconsolidated deposits throughout the county (*7*). The thickness of the overlying glacial and alluvial deposits ranges from 200 feet in ancient valleys to less than 1 foot on upland side slopes along the major drainageways where erosion has been intense. In places sandstone is at the top of the bedrock sequence. The shale commonly is relatively soft and can be penetrated with a shovel. It is generally silt loam or silty clay loam and commonly is calcareous. Soils that formed in material weathered from shale are weakly developed. An example is Marseilles soils.

Mine spoil is mixed and reworked overburden material deposited in the surface-mined areas. It is a heterogeneous mixture of glacial till, loess, shale, and siltstone. In some areas layers of replaced soil material overlie the mixed material. The soil material is loam, silt loam, silty clay loam, or clay loam; generally, it is firm or very firm, and commonly is calcareous directly below the surface layer. Lenzburg and Rapatee soils formed in mine spoil.

Plant and Animal Life

Soils are greatly affected by the type of vegetation under which they formed. The chief contribution of the vegetation and biological processes is the addition of organic matter and nitrogen to the soil. The kind of organic material in the soil depends primarily on the kind of native plants that grew on the soil. The remains of these plants accumulated on the surface, decayed, and eventually became organic matter or humus. The roots of the plants added organic matter as they decayed. They also provided channels for the downward movement of water through the soil.

The native vegetation in Knox County was mainly tall prairie grasses and deciduous hardwood trees (*4*). At the time of early settlement, about 57 percent of the county supported prairie grasses. These grasses have many fine fibrous roots that add large amounts of organic matter to the soil as they die and decay, especially if they are concentrated near the surface. Soils that formed under prairie vegetation, therefore, have a thick, black or dark brown surface layer. The prairie soils in the county are generally on the broad upland divides between streams. Ipava, Sable, and Tama soils formed under prairie vegetation.

About 33 percent of the county supported timber vegetation at the time of early settlement. These deciduous hardwood forests contributed organic matter to the soil mainly as leaf litter. Their root systems were less fibrous than those of grasses and generally were not densely concentrated near the surface. Therefore, these soils have a surface soil that is thinner and lighter colored than that of the soils that formed under prairie grasses. In general, they are on narrow upland divides between streams or on the side slopes bordering stream valleys.

The native vegetation in about 10 percent of the county was mixed prairie grasses and timber. These areas were primarily on bottom land between the heavily wooded side slopes along drainageways and the nearly level prairie areas. Most of the soils on bottom land are dark and have a high organic matter content, but the color is related more to the color of the sediments deposited by floodwater than to the native vegetation.

Although plants have been the major living organisms affecting soil formation, micro-organisms, earthworms, insects, and large burrowing animals that live in or on the soil have also affected soil formation. Bacteria and fungi help to break down and decompose dead plants and animals and turn them into humus. Burrowing animals, such as earthworms, cicadas, and ground squirrels, help to incorporate the humus into the soil. Humus is very important in the development of soil structure and good tilth.

Climate

Knox County has a temperate, humid, continental climate. The climate is essentially uniform throughout the county. Climatic differences are too small to have caused any obvious differences among the soils, except perhaps where its effect is modified locally by relief.

Climate affects soil formation through its effects on weathering, plant and animal life, and erosion. Water from rains and melting snow seeps slowly downward through the soil and causes physical and chemical changes. As the water moves downward, clay is moved from the surface soil to the subsoil, where it accumulates. The water dissolves minerals and moves them downward through the soil. This leaching has removed free lime from the upper layers of most of the soils in Knox County. The temperature of the soil also is important since rainfall on frozen soil does not facilitate soil formation if it runs off the surface. Many of the processes of soil formation are halted or slowed when the soil is frozen.

Climate also influences the kind and extent of plant and animal life. The climate in Knox County has favored tall prairie grasses and deciduous hardwood forests. It also has favored the decomposition of plants and animals, which are incorporated into the soil.

Heavy rains are harmful if they fall on soils that are exposed when they are farmed. Early spring rains can cause extensive erosion when the soil is partially frozen. The freezing restricts the rate of water intake and thus increases the runoff rate. More detailed information about the climate is available under the heading "General Nature of the County."

Relief

Relief, or local changes in elevation, has markedly affected the soils in Knox County through its effect on runoff, infiltration, erosion, and natural drainage. The slope in the county ranges from 0 to 70 percent.

To a large extent, relief determines how much water infiltrates a soil and how much runs off the surface. Runoff is most rapid and the infiltration rate slowest on the steeper slopes. In general, the runoff rate decreases as the slope decreases. In low areas water is temporarily ponded by runoff from adjacent slopes.

Relief also affects natural drainage, or the depth to a seasonal high water table. Through its effect on aeration of the soil, natural drainage determines the color of the subsoil. The poorly drained Edinburg soils are in depressions and have a water table close to the surface most of the year. The soil pores contain much water, which restricts the circulation of air in the soil. Under these conditions, naturally occurring iron and manganese compounds are chemically reduced. As a result, the subsoil is dull gray and mottled. In the more sloping, well drained Hickory soils, the water table is lower and most of the rainfall runs off the surface. The soil pores contain less water and much more air. The iron and manganese compounds are well oxidized. As a result, the subsoil is brown and brightly colored.

Nearly level, poorly drained soils, such as Sable soils, are less well developed than the gently sloping, moderately well drained Tama soils. Sable soils have a high water table much of the year. The wetness inhibits the removal of weathered products. In contrast, Tama soils are deeper to a water table. As a result, weathered products are translocated downward to a greater extent.

Local relief also directly determines the intensity of erosion. Some erosion occurs on all sloping soils, but the hazard is more severe as the slope and the runoff rate increase.

Time

Time determines, to great extent, the degree of profile development in a soil. The influence of time, however, can be modified by erosion, deposition of material, and local relief.

In most of the soils in Knox County, sufficient time has passed to allow for the removal of calcium carbonate from the upper horizons. In the severely eroded Sylvan soils, however, erosion has exposed the unleached loess. The upper horizons of these soils are still calcareous even though the surrounding soils have been leached of carbonate minerals.

The differences among soils resulting from the length of time that the parent materials have been in place are expressed in the degree of profile development. Dorchester soils have a very weakly expressed profile because they are on flood plains that periodically receive new alluvial sediments. Thus, they have not been in place long enough for distinct horizons to develop. Fayette soils are more strongly developed and have distinct horizons because the loess in which they formed has been in place a much longer time.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in

diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Final cut. The last cut or line of excavation made on a specific property or area.

Fine textured soil. Sandy clay, silty clay, and clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Highwall. The unexcavated face of exposed overburden and coal in a surface mine or the face or bank on the uphill side of a contour strip mine excavation.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Paleosol. A buried soil, especially one that formed during an interglacial period and was subsequently covered by more recent deposits.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.
pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)
Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.
Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.
Plastic limit. The moisture content at which a soil changes from semisolid to plastic.
Plowpan. A compacted layer formed in the soil directly below the plowed layer.
Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.
Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.
Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.
Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.
Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.
Relief. The elevations or inequalities of a land surface, considered collectively.
Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.
Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.
Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.
Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.
Root zone. The part of the soil that can be penetrated by plant roots.
Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.
Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
Sandstone. Sedimentary rock containing dominantly sand-size particles.
Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.
Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.
Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)
Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.
Shale. Sedimentary rock formed by the hardening of a clay deposit.
Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.
Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.
Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
Siltstone. Sedimentary rock made up of dominantly silt-sized particles.
Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management

requirements of the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily

rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Galesburg, Illinois]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	^{o}F	^{o}F	^{o}F	^{o}F	^{o}F	Units	In	In	In		In
January----	30.0	12.4	21.2	59	-17	0	1.60	0.59	2.43	4	7.2
February---	35.9	18.2	27.1	63	-12	0	1.36	.62	2.00	4	4.8
March------	46.0	27.1	36.6	77	4	27	2.74	1.16	4.08	7	5.2
April------	61.8	40.2	51.0	86	20	110	4.03	2.34	5.53	8	.7
May--------	72.6	50.6	61.6	92	32	372	3.69	2.09	5.10	7	.0
June-------	81.8	60.3	71.1	96	45	633	4.53	2.40	6.39	7	.0
July-------	85.2	64.3	74.8	97	49	769	4.32	2.67	5.79	7	.0
August-----	83.4	62.2	72.8	95	47	707	3.66	1.81	5.26	6	.0
September--	76.3	54.1	65.2	93	35	456	3.51	1.54	5.18	6	.0
October----	65.4	43.0	54.2	88	23	202	2.81	.97	4.33	5	.1
November---	48.8	30.3	39.6	74	7	15	1.88	.94	2.68	4	2.3
December---	35.1	19.2	27.2	64	-12	0	1.84	.73	2.77	5	5.8
Yearly:											
Average--	60.2	40.2	50.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	98	-18	---	---	---	---	---	---
Total----	---	---	---	---	---	3,291	35.97	29.87	41.79	70	26.1

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-78 at Galesburg, Illinois]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 13	Apr. 25	May 5
2 years in 10 later than--	Apr. 9	Apr. 20	May 1
5 years in 10 later than--	Apr. 1	Apr. 10	Apr. 23
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 13	Oct. 1
2 years in 10 earlier than--	Oct. 25	Oct. 18	Oct. 6
5 years in 10 earlier than--	Nov. 3	Oct. 27	Oct. 16

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Galesburg, Illinois]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	196	181	156
8 years in 10	203	187	162
5 years in 10	216	199	175
2 years in 10	228	211	188
1 year in 10	235	217	194

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
7D3	Atlas silty clay loam, 10 to 18 percent slopes, severely eroded	1,419	0.3
8D2	Hickory silt loam, 10 to 15 percent slopes, eroded	9,638	2.1
8E2	Hickory silt loam, 15 to 30 percent slopes, eroded	20,276	4.3
8G	Hickory loam, 30 to 50 percent slopes	6,696	1.4
17	Keomah silt loam	5,478	1.2
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded	2,007	0.4
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded	636	0.1
36B	Tama silt loam, 1 to 4 percent slopes	69,647	14.9
36B2	Tama silty clay loam, 2 to 5 percent slopes, eroded	19,399	4.2
36C2	Tama silty clay loam, 5 to 10 percent slopes, eroded	26,079	5.6
36D2	Tama silty clay loam, 10 to 15 percent slopes, eroded	849	0.2
43A	Ipava silt loam, 0 to 3 percent slopes	79,128	16.9
45	Denny silt loam	1,166	0.2
68	Sable silty clay loam	15,176	3.3
74	Radford silt loam	4,707	1.0
77	Huntsville silt loam	5,307	1.1
81B	Littleton silt loam, 1 to 3 percent slopes	1,508	0.3
104	Virgil silt loam	299	0.1
107+	Sawmill silty clay loam, overwash	6,086	1.3
119D2	Elco silt loam, 8 to 15 percent slopes, eroded	9,306	2.0
119E2	Elco silt loam, 15 to 20 percent slopes, eroded	4,494	1.0
131B	Alvin sandy loam, 2 to 6 percent slopes	283	0.1
131D	Alvin sandy loam, 8 to 15 percent slopes	260	0.1
131E	Alvin sandy loam, 15 to 30 percent slopes	456	0.1
134B	Camden silt loam, 2 to 5 percent slopes	408	0.1
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	530	0.1
134D2	Camden silt loam, 10 to 18 percent slopes, eroded	348	0.1
239	Dorchester silt loam	2,548	0.5
249	Edinburg silty clay loam	249	0.1
257	Clarksdale silt loam	12,576	2.7
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded	3,844	0.8
259D2	Assumption silt loam, 10 to 15 percent slopes, eroded	2,746	0.6
259D3	Assumption silty clay loam, 8 to 15 percent slopes, severely eroded	1,030	0.2
279B	Rozetta silt loam, 1 to 5 percent slopes	21,550	4.6
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	30,162	6.5
280B	Fayette silt loam, 2 to 5 percent slopes	4,425	0.9
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	5,849	1.3
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded	3,528	0.8
280E	Fayette silt loam, 15 to 25 percent slopes	323	0.1
344B	Harvard silt loam, 1 to 5 percent slopes	465	0.1
386B	Downs silt loam, 2 to 6 percent slopes	13,700	2.9
415	Orion silt loam	2,134	0.5
451	Lawson silt loam	15,877	3.4
533	Urban land	2,047	0.4
536	Dumps, mine	585	0.1
549D2	Marseilles silt loam, 10 to 15 percent slopes, eroded	868	0.2
549E	Marseilles silt loam, 15 to 30 percent slopes	5,617	1.2
549G	Marseilles silt loam, 30 to 60 percent slopes	7,033	1.5
567B2	Elkhart silty clay loam, 3 to 5 percent slopes, eroded	415	0.1
567C2	Elkhart silty clay loam, 5 to 10 percent slopes, eroded	5,607	1.2
567D3	Elkhart silty clay loam, 8 to 15 percent slopes, severely eroded	794	0.2
660C2	Coatsburg silty clay loam, 5 to 12 percent slopes, eroded	336	0.1
801B	Orthents, silty, gently sloping	855	0.2
802B	Orthents, loamy, gently sloping	53	*
863	Pits, clay	93	*
864	Pits, quarries	81	*
865	Pits, gravel	85	*
871B	Lenzburg silty clay loam, 1 to 7 percent slopes	5,653	1.2
871D	Lenzburg silt loam, 10 to 20 percent slopes	4,365	0.9
871G	Lenzburg loam, 20 to 70 percent slopes	9,167	2.0
872B	Rapatee silty clay loam, 1 to 7 percent slopes	1,384	0.3
2036C	Tama-Urban land complex, 3 to 10 percent slopes	778	0.2
2901B	Ipava-Urban land-Tama complex, 1 to 5 percent slopes	1,412	0.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
2902A	Ipava-Urban land-Sable complex, 0 to 3 percent slopes	2,455	0.5
	Water	4,285	0.9
	Total	466,560	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
17	Keomah silt loam (where drained)
36B	Tama silt loam, 1 to 4 percent slopes
36B2	Tama silty clay loam, 2 to 5 percent slopes, eroded
43A	Ipava silt loam, 0 to 3 percent slopes
45	Denny silt loam (where drained)
68	Sable silty clay loam (where drained)
74	Radford silt loam
77	Huntsville silt loam
81B	Littleton silt loam, 1 to 3 percent slopes
104	Virgil silt loam (where drained)
107+	Sawmill silty clay loam, overwash (where drained and either protected from flooding or not frequently flooded during the growing season)
131B	Alvin sandy loam, 2 to 6 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
239	Dorchester silt loam
249	Edinburg silty clay loam (where drained)
257	Clarksdale silt loam (where drained)
279B	Rozetta silt loam, 1 to 5 percent slopes
280B	Fayette silt loam, 2 to 5 percent slopes
344B	Harvard silt loam, 1 to 5 percent slopes
386B	Downs silt loam, 2 to 6 percent slopes
415	Orion silt loam (where protected from flooding or not frequently flooded during the growing season)
451	Lawson silt loam
567B2	Elkhart silty clay loam, 3 to 5 percent slopes, eroded
871B	Lenzburg silty clay loam, 1 to 7 percent slopes
872B	Rapatee silty clay loam, 1 to 7 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
7D3------------- Atlas	VIe	---	---	15	34	1.7	2.8
8D2------------- Hickory	IIIe	72	23	26	50	2.7	4.5
8E2------------- Hickory	VIe	---	---	---	---	2.1	3.6
8G-------------- Hickory	VIIe	---	---	---	---	---	3.0
17-------------- Keomah	IIw	129	39	52	72	5.1	8.6
19C3------------ Sylvan	IVe	97	30	46	57	4.3	7.2
19D3------------ Sylvan	IVe	93	29	44	55	4.1	6.9
36B------------- Tama	IIe	153	46	61	88	5.8	9.7
36B2------------ Tama	IIe	149	44	60	85	5.7	9.4
36C2------------ Tama	IIIe	146	43	58	84	5.5	9.2
36D2------------ Tama	IIIe	140	41	56	80	5.3	8.8
43A------------- Ipava	I	163	52	66	91	6.1	10.2
45-------------- Denny	IIw	113	37	47	62	4.0	6.7
68-------------- Sable	IIw	156	51	61	85	5.6	9.3
74-------------- Radford	IIw	98	29	33	68	3.6	5.8
77-------------- Huntsville	IIw	106	34	45	60	4.1	6.8
81B------------- Littleton	IIe	157	49	62	89	6.0	10.1
104------------- Virgil	I	148	45	60	84	5.6	9.3
107+------------ Sawmill	IIw	147	47	54	76	5.5	8.8
119D2----------- Elco	IIIe	104	34	44	60	4.1	6.8

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
119E2----------- Elco	IVe	97	---	41	56	3.8	6.4
131B------------ Alvin	IIe	97	33	48	---	4.3	7.1
131D------------ Alvin	IIIe	92	31	45	---	4.0	6.7
131E------------ Alvin	VIe	---	---	---	---	3.1	5.3
134B------------ Camden	IIe	124	39	54	71	5.0	8.2
134C2----------- Camden	IIIe	121	38	53	70	4.9	8.1
134D2----------- Camden	IVe	113	35	50	65	4.5	7.5
239------------- Dorchester	IIw	112	40	46	65	4.5	7.5
249------------- Edinburg	IIw	132	43	55	72	4.6	7.6
257------------- Clarksdale	I	140	43	57	79	5.3	8.5
259C2----------- Assumption	IIIe	123	37	54	74	4.8	8.0
259D2----------- Assumption	IIIe	116	35	51	70	4.6	7.6
259D3----------- Assumption	IVe	91	---	40	55	3.6	5.9
279B------------ Rozetta	IIe	130	40	53	72	5.1	8.6
279C2----------- Rozetta	IIIe	123	38	51	69	4.9	8.2
280B------------ Fayette	IIe	128	39	52	72	5.1	8.6
280C2----------- Fayette	IIIe	121	37	50	69	4.9	8.2
280D2----------- Fayette	IIIe	116	35	48	66	4.7	7.8
280E------------ Fayette	VIe	---	---	---	60	4.3	7.2
344B------------ Harvard	IIe	131	41	53	77	5.1	8.6
386B------------ Downs	IIe	147	43	58	82	5.5	9.2

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
415------------- Orion	IIw	115	37	---	61	4.0	6.6
451------------- Lawson	IIw	130	43	---	80	5.5	---
533**. Urban land							
536**. Dumps							
549D2----------- Marseilles	IVe	90	---	40	56	3.8	6.3
549E------------ Marseilles	VIIe	---	---	---	---	---	5.4
549G------------ Marseilles	VIIe	---	---	---	---	---	3.3
567B2----------- Elkhart	IIe	131	39	52	72	5.0	8.4
567C2----------- Elkhart	IIIe	128	38	51	71	4.9	8.2
567D3----------- Elkhart	IVe	110	---	44	61	4.2	7.1
660C2----------- Coatsburg	IIIe	73	23	25	40	2.9	4.8
801B, 802B. Orthents							
863**, 864**, 865**. Pits							
871B------------ Lenzburg	IIe	75	23	26	---	3.4	5.5
871D------------ Lenzburg	VIe	---	---	---	---	2.5	4.2
871G------------ Lenzburg	VIIe	---	---	---	---	---	3.8
872B------------ Rapatee	IIe	100	35	47	---	4.2	4.5
2036C**. Tama-Urban land							
2901B**. Ipava-Urban land-Tama							

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
2902A**. Ipava-Urban land-Sable							

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
7D3------------- Atlas	4C	Slight	Slight	Moderate	Moderate	White oak-----------	70	4	Green ash, pin oak, red maple, Austrian pine.
						Northern red oak----	70	4	
						Bur oak------------	70	---	
						Green ash-----------	---	---	
8D2------------- Hickory	4A	Slight	Slight	Slight	Slight	White oak-----------	85	4	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	4	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
8E2------------- Hickory	4R	Moderate	Moderate	Slight	Slight	White oak-----------	85	4	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	4	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
8G-------------- Hickory	4R	Severe	Severe	Slight	Slight	White oak-----------	85	4	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	4	
						Black oak-----------	---	---	
						Green ash-----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	7	
19C3, 19D3------ Sylvan	6A	Slight	Slight	Slight	Slight	Yellow-poplar-------	90	6	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
						White oak-----------	80	4	
						Northern red oak----	80	4	
						Black walnut--------	---	---	
107+------------ Sawmill	4W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	4	American sycamore, hackberry, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
119D2----------- Elco	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
						Northern red oak----	---	---	
						Black walnut--------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
119E2 Elco	4R	Moderate	Moderate	Moderate	Slight	White oak	80	4	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
						Northern red oak	---	---	
						Black walnut	---	---	
131D Alvin	4A	Slight	Slight	Slight	Slight	White oak	80	4	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak	80	4	
						Black walnut	---	---	
						Yellow-poplar	90	6	
131E Alvin	4R	Moderate	Moderate	Slight	Slight	White oak	80	4	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak	80	4	
						Black walnut	---	---	
						Yellow-poplar	90	6	
134C2, 134D2 Camden	7A	Slight	Slight	Slight	Slight	Yellow-poplar	95	7	White ash, white oak, black walnut, green ash, eastern white pine, red pine, yellow-poplar, black locust.
						Green ash	76	3	
						White oak	85	4	
						Northern red oak	85	4	
						Sweetgum	80	6	
239 Dorchester	3A	Slight	Slight	Slight	Slight	White oak	55	3	Hackberry, green ash, cottonwood.
						Northern red oak	55	3	
279B, 279C2 Rozetta	4A	Slight	Slight	Slight	Slight	White oak	80	4	Eastern white pine, northern red oak, green ash, Scotch pine, yellow-poplar.
						Northern red oak	80	4	
						Yellow-poplar	90	6	
						Black walnut	---	---	
280B, 280C2, 280D2 Fayette	4A	Slight	Slight	Slight	Slight	White oak	80	4	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak	80	4	
						Yellow-poplar	90	6	
						Black walnut	---	---	
280E Fayette	4R	Moderate	Moderate	Slight	Slight	White oak	80	4	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak	80	4	
						Yellow-poplar	90	6	
						Black walnut	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
386B------------ Downs	4A	Slight	Slight	Slight	Slight	White oak-----------	80	4	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	4	
						Yellow-poplar-------	90	6	
						Black walnut--------	---	---	
415------------- Orion	2W	Slight	Moderate	Slight	Slight	Silver maple--------	80	2	White spruce, silver maple, white ash, eastern cottonwood.
						Red maple-----------	---	---	
						White ash-----------	---	---	
549D2----------- Marseilles	3A	Slight	Slight	Slight	Slight	White oak-----------	66	3	White oak, northern red oak, black oak, white ash, eastern white pine, Scotch pine, black walnut.
						Northern red oak----	66	3	
						Black oak-----------	---	---	
						White ash-----------	---	---	
549E------------ Marseilles	3R	Moderate	Moderate	Slight	Slight	White oak-----------	66	3	White oak, northern red oak, black oak, white ash, eastern white pine, Scotch pine, black walnut.
						Northern red oak----	66	3	
						Black oak-----------	---	---	
						White ash-----------	---	---	
549G------------ Marseilles	3R	Severe	Severe	Slight	Slight	White oak-----------	66	3	White oak, northern red oak, black oak, white ash, eastern white pine, Scotch pine, black walnut.
						Northern red oak----	66	3	
						Black oak-----------	---	---	
						White ash-----------	---	---	
871B------------ Lenzburg	3A	Slight	Slight	Slight	Slight	Black walnut--------	73	---	Black walnut, green ash, white ash, eastern cottonwood.
						Sweetgum------------	---	---	
						Eastern cottonwood--	---	---	
871D------------ Lenzburg	3R	Moderate	Moderate	Slight	Slight	Black walnut--------	73	---	Black walnut, green ash, white ash, eastern cottonwood.
						Sweetgum------------	---	---	
						Eastern cottonwood--	---	---	
871G------------ Lenzburg	3R	Severe	Severe	Slight	Slight	Black walnut--------	73	---	Black walnut, green ash, white ash, eastern cottonwood.
						Sweetgum------------	---	---	
						Eastern cottonwood--	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
7D3--------------- Atlas	---	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
8D2, 8E2, 8G------ Hickory	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
17---------------- Keomah	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
19C3, 19D3-------- Sylvan	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36B, 36B2, 36C2, 36D2------------- Tama	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern white-cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
43A--------------- Ipava	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
45---------------- Denny	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern white-cedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
68---------------- Sable	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
74----------------- Radford	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar.	Norway spruce-----	Eastern white pine, pin oak.
77----------------- Huntsville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
81B---------------- Littleton	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Eastern white pine, Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Pin oak.
104---------------- Virgil	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
107+--------------- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
119D2, 119E2------ Elco	---	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
131B, 131D, 131E-- Alvin	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, northern white-cedar, osageorange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
134B, 134C2, 134D2------------ Camden	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Northern white-cedar, white fir, Washington hawthorn, blue spruce.	Austrian pine, Norway spruce.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
239. Dorchester	---	Tatarian honeysuckle, Siberian peashrub.	Green ash, osageorange, eastern redcedar, northern white-cedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow, golden willow.	Eastern cottonwood.
249. Edinburg	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
257. Clarksdale	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce	Eastern white pine, pin oak.
259C2, 259D2, 259D3. Assumption	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
279B, 279C2. Rozetta	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B, 280C2, 280D2, 280E. Fayette	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
344B. Harvard	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
386B. Downs	---	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern white-cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
415. Orion	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
451. Lawson	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
533*. Urban land					
536*. Dumps					
549D2, 549E, 549G. Marseilles	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, eastern redcedar, radiant crabapple.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
567B2, 567C2, 567D3. Elkhart	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
660C2. Coatsburg	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
801B, 802B. Orthents					
863*, 864*, 865*. Pits					
871B, 871D, 871G. Lenzburg	Siberian peashrub, Tatarian honeysuckle.	Eastern redcedar, jack pine, Washington hawthorn, osageorange, Russian-olive.	Honeylocust, northern catalpa.	---	---

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
872B------------- Rapatee	Tatarian honeysuckle, Siberian peashrub.	Eastern redcedar, jack pine, Washington hawthorn, osageorange, Russian-olive.	Honeylocust, northern catalpa.	---	---
2036C*:					
Tama-------------	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern white-cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Urban land.					
2901B*:					
Ipava------------	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Urban land.					
Tama-------------	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern white-cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
2902A*:					
Ipava------------	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Urban land.					
Sable------------	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
7D3 Atlas	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness.	Severe: wetness.
8D2 Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
8E2 Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8G Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
17 Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
19C3 Sylvan	Slight	Slight	Severe: slope.	Slight	Slight.
19D3 Sylvan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
36B, 36B2 Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
36C2 Tama	Slight	Slight	Severe: slope.	Slight	Slight.
36D2 Tama	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
43A Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
45 Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68 Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
74 Radford	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
77 Huntsville	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
81B Littleton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
104 Virgil	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
107+ Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
119D2 Elco	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
119E2 Elco	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
131B Alvin	Slight	Slight	Moderate: slope.	Slight	Slight.
131D Alvin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
131E Alvin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
134B Camden	Slight	Slight	Moderate: slope.	Slight	Slight.
134C2 Camden	Slight	Slight	Severe: slope.	Slight	Slight.
134D2 Camden	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
239 Dorchester	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
249 Edinburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
257 Clarksdale	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
259C2 Assumption	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
259D2 Assumption	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
259D3 Assumption	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
279B Rozetta	Slight	Slight	Moderate: slope.	Slight	Slight.
279C2 Rozetta	Slight	Slight	Severe: slope.	Slight	Slight.
280B Fayette	Slight	Slight	Moderate: slope.	Slight	Slight.
280C2 Fayette	Slight	Slight	Severe: slope.	Slight	Slight.
280D2 Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
280E Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
344B------------------ Harvard	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
386B------------------ Downs	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
415------------------- Orion	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
451------------------- Lawson	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
533*. Urban land					
536*. Dumps					
549D2----------------- Marseilles	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, depth to rock.
549E------------------ Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
549G------------------ Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
567B2----------------- Elkhart	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
567C2----------------- Elkhart	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
567D3----------------- Elkhart	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
660C2----------------- Coatsburg	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
801B, 802B. Orthents					
863*, 864*, 865*. Pits					
871B------------------ Lenzburg	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: large stones.
871D------------------ Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
871G------------------ Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
872B------------------ Rapatee	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Moderate: droughty.
2036C*:					
Tama-----------------	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
Urban land.					
2901B*:					
Ipava----------------	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
Tama-----------------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
2902A*:					
Ipava----------------	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
Sable----------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
7D3 Atlas	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
8D2 Hickory	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
8E2 Hickory	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
8G Hickory	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
17 Keomah	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
19C3, 19D3 Sylvan	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
36B, 36B2 Tama	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
36C2, 36D2 Tama	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
43A Ipava	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
45 Denny	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
68 Sable	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
74 Radford	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
77 Huntsville	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
81B Littleton	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
104 Virgil	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
107+ Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
119D2 Elco	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
119E2 Elco	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
131B Alvin	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
131D Alvin	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
131E---------------- Alvin	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
134B---------------- Camden	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
134C2--------------- Camden	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
134D2--------------- Camden	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
239----------------- Dorchester	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Poor	Poor.
249----------------- Edinburg	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
257----------------- Clarksdale	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
259C2, 259D2, 259D3------------- Assumption	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
279B---------------- Rozetta	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
279C2--------------- Rozetta	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
280B---------------- Fayette	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
280C2, 280D2-------- Fayette	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
280E---------------- Fayette	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
344B---------------- Harvard	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
386B---------------- Downs	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
415----------------- Orion	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
451----------------- Lawson	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
533*. Urban land									
536*. Dumps									
549D2--------------- Marseilles	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
549E--------------- Marseilles	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
549G--------------- Marseilles	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
567B2, 567C2------- Elkhart	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
567D3-------------- Elkhart	Fair	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
660C2-------------- Coatsburg	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
801B, 802B. Orthents									
863*, 864*, 865*. Pits									
871B--------------- Lenzburg	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
871D--------------- Lenzburg	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
871G--------------- Lenzburg	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
872B--------------- Rapatee	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
2036C*:									
Tama---------------	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Urban land.									
2901B*:									
Ipava--------------	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Urban land.									
Tama---------------	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
2902A*:									
Ipava--------------	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Urban land.									
Sable--------------	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
7D3: Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness.	Severe: wetness.
8D2: Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
8E2, 8G: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17: Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, frost action, low strength.	Slight.
19C3: Sylvan	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
19D3: Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
36B, 36B2: Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
36C2: Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
36D2: Tama	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
43A: Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
45: Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
74: Radford	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
77: Huntsville	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: flooding.
81B: Littleton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
104: Virgil	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
107+: Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
119D2: Elco	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
119E2: Elco	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
131B: Alvin	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
131D: Alvin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
131E: Alvin	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
134B: Camden	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
134C2: Camden	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
134D2: Camden	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
239: Dorchester	Severe: excess humus.	Severe: flooding.	Severe: flooding, low strength.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
249: Edinburg	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding.	Severe: ponding.
257: Clarksdale	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, frost action, low strength.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
259C2: Assumption	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
259D2, 259D3: Assumption	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
279B: Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
279C2: Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
280B: Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2: Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280D2: Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
280E: Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.	Severe: slope.
344B: Harvard	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
386B: Downs	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
415: Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
451: Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
533*. Urban land						
536*. Dumps						
549D2: Marseilles	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, depth to rock.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
549E, 549G-------- Marseilles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
567B2------------- Elkhart	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
567C2------------- Elkhart	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
567D3------------- Elkhart	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
660C2------------- Coatsburg	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness.	Severe: wetness.
801B, 802B. Orthents						
863*, 864*, 865*. Pits						
871B-------------- Lenzburg	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
871D, 871G-------- Lenzburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
872B-------------- Rapatee	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Moderate: droughty.
2036C*:						
Tama--------------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
Urban land.						
2901B*:						
Ipava-------------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
Urban land.						
Tama--------------	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2902A*:						
Ipava------------	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
Urban land.						
Sable------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
7D3----------------- Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Poor: too clayey, hard to pack.
8D2----------------- Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Fair: too clayey, slope.
8E2, 8G------------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
17------------------ Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack.
19C3---------------- Sylvan	Slight---------------	Severe: slope.	Slight---------------	Good.
19D3---------------- Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope.
36B, 36B2----------- Tama	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
36C2---------------- Tama	Moderate: wetness.	Severe: slope.	Moderate: wetness.	Fair: too clayey.
36D2---------------- Tama	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope.	Fair: too clayey, slope.
43A----------------- Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
45------------------ Denny	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
68------------------ Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
74------------------ Radford	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Poor: wetness.
77------------------ Huntsville	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
81B----------------- Littleton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
104----------------- Virgil	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
107+ Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Poor: wetness.
119D2 Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Poor: too clayey.
119E2 Elco	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: slope.	Poor: too clayey, slope.
131B Alvin	Slight	Severe: seepage.	Severe: seepage.	Fair: thin layer.
131D Alvin	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Fair: slope, thin layer.
131E Alvin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
134B Camden	Moderate: wetness.	Severe: seepage.	Moderate: wetness.	Fair: too clayey.
134C2 Camden	Moderate: wetness.	Severe: seepage, slope.	Moderate: wetness.	Fair: too clayey.
134D2 Camden	Moderate: wetness, slope.	Severe: seepage, slope.	Moderate: wetness, slope.	Fair: too clayey, slope.
239 Dorchester	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: thin layer.
249 Edinburg	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
257 Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
259C2 Assumption	Severe: wetness, percs slowly.	Severe: slope, wetness.	Slight	Fair: too clayey, wetness.
259D2, 259D3 Assumption	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: slope.	Fair: too clayey, slope, wetness.
279B Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
279C2 Rozetta	Moderate: wetness.	Severe: slope.	Moderate: wetness.	Fair: too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
280B Fayette	Slight	Moderate: slope, seepage.	Slight	Fair: too clayey.
280C2 Fayette	Slight	Severe: slope.	Slight	Fair: too clayey.
280D2 Fayette	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope, too clayey.
280E Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
344B Harvard	Moderate: percs slowly.	Severe: seepage.	Slight	Fair: too clayey.
386B Downs	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
415 Orion	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Poor: wetness.
451 Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
533*. Urban land				
536*. Dumps				
549D2 Marseilles	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
549E, 549G Marseilles	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
567B2 Elkhart	Slight	Moderate: seepage, slope.	Slight	Good.
567C2 Elkhart	Slight	Severe: slope.	Slight	Good.
567D3 Elkhart	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope.
660C2 Coatsburg	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Poor: too clayey, hard to pack.
801B, 802B. Orthents				

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
863*, 864*, 865*. Pits				
871B---------------- Lenzburg	Severe: percs slowly.	Moderate: slope.	Slight----------------	Fair: too clayey, small stones.
871D, 871G---------- Lenzburg	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Poor: slope.
872B---------------- Rapatee	Severe: percs slowly.	Moderate: slope.	Slight----------------	Fair: too clayey, small stones.
2036C*:				
Tama----------------	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
Urban land.				
2901B*:				
Ipava---------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.				
Tama----------------	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
2902A*:				
Ipava---------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.				
Sable---------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
7D3 Atlas	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
8D2 Hickory	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
8E2 Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8G Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
17 Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
19C3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
19D3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
36B, 36B2, 36C2 Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
36D2 Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
43A Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
45 Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68 Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
74 Radford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
77 Huntsville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
81B Littleton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
104 Virgil	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
107+ Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
119D2: Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
119E2: Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
131B: Alvin	Good	Probable	Improbable: too sandy.	Good.
131D: Alvin	Good	Probable	Improbable: too sandy.	Fair: slope.
131E: Alvin	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope.
134B, 134C2: Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
134D2: Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
239: Dorchester	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
249: Edinburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
257: Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
259C2: Assumption	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
259D2: Assumption	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
259D3: Assumption	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
279B, 279C2: Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
280B, 280C2: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
280D2: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
280E: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
344B: Harvard	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
386B: Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
415: Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
451: Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
533*. Urban land				
536*. Dumps				
549D2----------------- Marseilles	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
549E------------------ Marseilles	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
549G------------------ Marseilles	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
567B2, 567C2---------- Elkhart	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
567D3----------------- Elkhart	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
660C2----------------- Coatsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
801B, 802B. Orthents				
863*, 864*, 865*. Pits				
871B------------------ Lenzburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
871D------------------ Lenzburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
871G------------------ Lenzburg	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
872B------------------ Rapatee	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
2036C*: Tama------------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Urban land.				
2901B*: Ipava-----------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2901B*:				
Urban land.				
Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
2902A*:				
Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				
Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
7D3 Atlas	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, wetness.	Wetness, slope.
8D2, 8E2, 8G Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
17 Keomah	Slight	Severe: hard to pack.	Frost action, percs slowly.	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.	Erodes easily, percs slowly.
19C3 Sylvan	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
19D3 Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
36B Tama	Moderate: seepage.	Slight	Deep to water	Favorable	Erodes easily	Erodes easily.
36B2, 36C2 Tama	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
36D2 Tama	Severe: slope.	Slight	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
43A Ipava	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
45 Denny	Slight	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
68 Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
74 Radford	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
77 Huntsville	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Flooding	Favorable	Favorable.
81B Littleton	Moderate: seepage.	Severe: wetness, piping.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
104 Virgil	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
107+ Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
119D2, 119E2 Elco	Severe: slope.	Moderate: piping, wetness.	Frost action, slope.	Wetness, slope, erodes easily.	Slope, erodes easily, wetness.	Slope, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
131B------------- Alvin	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
131D, 131E-------- Alvin	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope.	Slope, soil blowing.	Slope.
134B, 134C2------- Camden	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
134D2------------ Camden	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
239-------------- Dorchester	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
249-------------- Edinburg	Moderate: seepage.	Severe: hard to pack, ponding.	Percs slowly, ponding, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
257-------------- Clarksdale	Slight---------	Severe: wetness.	Frost action---	Wetness, erodes easily.	Wetness, erodes easily.	Wetness, erodes easily.
259C2------------ Assumption	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
259D2------------ Assumption	Severe: slope.	Moderate: piping.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
259D3------------ Assumption	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
279B, 279C2------- Rozetta	Moderate: seepage, slope.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280B, 280C2------- Fayette	Moderate: slope, seepage.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280D2, 280E------- Fayette	Severe: slope.	Slight---------	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
344B------------- Harvard	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
386B------------- Downs	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
415-------------- Orion	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
451-------------- Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
533*. Urban land						

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
536*. Dumps						
549D2, 549E, 549G- Marseilles	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
567B2, 567C2------ Elkhart	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
567D3------------ Elkhart	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
660C2------------ Coatsburg	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
801B, 802B. Orthents						
863*, 864*, 865*. Pits						
871B------------- Lenzburg	Moderate: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Large stones, erodes easily.	Erodes easily.
871D------------- Lenzburg	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, large stones, erodes easily.	Slope, erodes easily.
871G------------- Lenzburg	Severe: slope.	Moderate: piping.	Deep to water		Slope, large stones, erodes easily.	Slope, erodes easily.
872B------------- Rapatee	Moderate: slope.	Severe: piping.	Deep to water	Droughty, percs slowly, rooting depth.	Erodes easily, percs slowly.	Erodes easily, droughty.
2036C*: Tama-------------	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
Urban land.						
2901B*: Ipava------------	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
Urban land.						
Tama-------------	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
2902A*: Ipava------------	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
Urban land.						
Sable------------	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
7D3 Atlas	0-11	Silty clay loam	CH, CL	A-7	0	100	100	95-100	75-95	45-65	30-40
	11-60	Silty clay loam, silty clay, clay loam.	CH	A-7	0	100	95-100	95-100	80-95	50-70	30-45
8D2, 8E2 Hickory	0-17	Silt loam	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	17-40	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
	40-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
8G Hickory	0-17	Loam	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	17-40	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
	40-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	80-95	80-95	60-80	20-40	5-20
17 Keomah	0-12	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	12-38	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	100	95-100	45-60	30-45
	38-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
19C3, 19D3 Sylvan	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	8-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	20-30
	27-60	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
36B Tama	0-13	Silt loam	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	13-47	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	47-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
36B2, 36C2, 36D2 Tama	0-8	Silty clay loam	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	8-42	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	42-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
43A Ipava	0-10	Silt loam	ML, CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	10-37	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	37-60	Silt loam	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
45 Denny	0-19	Silt loam	CL	A-6, A-4	0	100	100	95-100	95-100	30-40	8-15
	19-44	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	44-60	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-60	15-35
68 Sable	0-21	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	95-100	41-65	15-35
	21-44	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	44-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
74 Radford	0-26	Silt loam	ML, CL	A-4, A-6	0	100	100	95-100	80-100	30-40	5-15
	26-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	100	100	95-100	80-95	35-50	15-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
77 Huntsville	0-27	Silt loam	CL	A-6	0	100	95-100	90-100	85-100	25-40	10-20
	27-52	Silt loam	CL	A-6	0	100	95-100	90-100	85-100	20-35	10-20
	52-60	Silt loam, loam, very fine sandy loam.	CL-ML, CL, SM-SC, SC	A-4, A-6, A-2	0	95-100	90-100	85-95	30-85	20-35	5-20
81B Littleton	0-6	Silt loam	CL	A-4, A-6	0	100	100	95-100	90-100	25-40	7-20
	6-32	Silt loam	CL	A-4, A-6	0	100	100	95-100	90-100	25-40	7-20
	32-60	Silt loam	CL-ML, CL	A-4, A-6, A-7	0	100	100	95-100	80-100	20-45	5-20
104 Virgil	0-13	Silt loam	CL	A-4, A-6	0	100	100	90-100	85-95	20-35	8-20
	13-47	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	15-30
	47-60	Loam, sandy loam, clay loam.	CL, SC, SM-SC, CL-ML	A-2, A-4, A-6	0-5	90-100	85-100	70-100	30-90	20-35	5-15
107+ Sawmill	0-25	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	25-38	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	38-54	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	54-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
119D2, 119E2 Elco	0-4	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	4-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	22-60	Silty clay loam, loam, clay.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30
131B, 131D, 131E Alvin	0-20	Sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	20-45	Very fine sandy loam, sandy loam, sandy clay loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	90-100	20-80	15-38	NP-13
	45-60	Stratified sandy loam to fine sand.	SM, SP, SP-SM	A-2, A-3	0-5	95-100	90-100	70-95	4-35	<20	NP-4
134B, 134C2, 134D2 Camden	0-8	Silt loam	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	8-32	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	90-100	25-40	15-25
	32-44	Loam, clay loam, silt loam.	ML, SM, CL, SC	A-2, A-4, A-6	0-5	90-100	85-100	60-90	30-70	20-40	3-15
	44-60	Loam, sandy loam, silt loam.	SM, SC, ML, CL	A-2, A-4	0-5	90-100	80-100	50-80	20-60	<25	3-10
239 Dorchester	0-6	Silt loam	ML, CL-ML, CL	A-4	0	100	100	95-100	90-95	25-35	5-10
	6-60	Silt loam, silty clay loam, clay loam.	OL, ML, CL	A-6, A-7	0	100	100	95-100	90-95	35-45	10-20
249 Edinburg	0-16	Silty clay loam	CL	A-7, A-6	0	100	100	98-100	90-100	35-50	16-25
	16-50	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	98-100	90-100	45-70	28-45
	50-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	98-100	90-100	35-45	15-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
257-------------- Clarksdale	0-10	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	25-40	10-20
	10-42	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	25-40
	42-60	Silt loam, silty clay loam.	CL	A-6	0	98-100	98-100	95-100	90-100	25-40	10-25
259C2, 259D2----- Assumption	0-9	Silt loam--------	CL, ML	A-6, A-4	0	100	100	95-100	90-100	25-40	8-20
	9-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	10-30
	27-60	Clay loam, loam	CL	A-6, A-7	0-5	100	95-100	90-100	70-90	35-50	20-35
259D3------------ Assumption	0-5	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	90-100	30-45	15-30
	5-22	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	10-30
	22-60	Clay loam, loam	CL	A-6, A-7	0-5	100	95-100	90-100	70-90	35-50	20-35
279B, 279C2------ Rozetta	0-9	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	9-53	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	53-60	Silt loam--------	CL	A-6	0	100	100	95-100	95-100	25-40	10-20
280B, 280C2, 280D2, 280E----- Fayette	0-11	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	11-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
344B------------- Harvard	0-7	Silt loam--------	CL	A-4, A-6	0	100	95-100	90-100	85-100	30-40	8-15
	7-37	Silty clay loam, silt loam.	ML	A-6, A-7	0	100	90-100	90-100	85-100	35-50	10-20
	37-45	Clay loam, silt loam, sandy clay loam.	ML	A-4, A-6, A-7	0-3	95-100	85-95	75-90	55-85	30-50	5-20
	45-60	Stratified clay loam to loamy sand.	SM, CL-ML, SM-SC, CL	A-2, A-4, A-6, A-7	0-5	90-100	80-95	40-90	15-70	20-45	NP-20
386B------------- Downs	0-14	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	14-60	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
415-------------- Orion	0-4	Silt loam--------	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	4-29	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	29-57	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
	57-60	Silt loam--------	CL, CL-ML	A-4	0	80-100	80-100	80-100	80-100	20-30	4-10
451-------------- Lawson	0-31	Silt loam--------	CL, CL-ML	A-4	0	100	100	90-100	85-100	20-30	5-10
	31-60	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	60-100	20-40	10-25
533*. Urban land											
536*. Dumps											
549D2, 549E, 549G------------ Marseilles	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-40	5-15
	6-34	Silty clay loam, silty clay, clay loam.	CL, CH	A-7	0-5	95-100	90-100	85-100	80-95	40-60	15-30
	34-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
567B2, 567C2----- Elkhart	0-8	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-50	18-30
	8-35	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	18-30
	35-60	Silt loam, silt	CL	A-6, A-4	0	100	100	95-100	95-100	20-37	8-20
567D3------------ Elkhart	0-5	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-50	18-30
	5-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	18-30
	28-60	Silt loam, silt	CL	A-6, A-4	0	100	100	95-100	95-100	20-37	8-20
660C2------------ Coatsburg	0-8	Silty clay loam	CL	A-6, A-7	0	100	100	85-95	70-90	35-50	15-30
	8-36	Silty clay, clay, clay loam.	CH	A-7	0	100	95-100	75-90	65-85	50-70	35-55
	36-60	Loam, clay loam	CL, CH	A-6, A-7	0-5	100	95-100	70-100	60-80	35-55	15-30
801B, 802B. Orthents											
863*, 864*, 865*. Pits											
871B------------- Lenzburg	0-2	Silty clay loam	CL, ML	A-6, A-7, A-4	2-10	80-100	75-100	65-95	55-85	25-50	8-25
	2-60	Silty clay loam, silt loam, gravelly loam.	CL	A-6, A-7	5-15	75-95	70-90	65-85	60-85	25-45	10-25
871D------------- Lenzburg	0-2	Silt loam--------	CL, ML	A-6, A-7, A-4	2-10	80-100	75-100	65-95	55-85	25-50	8-25
	2-60	Silty clay loam, silt loam, gravelly loam.	CL	A-6, A-7	5-15	75-95	70-90	65-85	60-85	25-45	10-25
871G------------- Lenzburg	0-2	Loam------------	CL, ML	A-6, A-7, A-4	2-10	80-100	75-100	65-95	55-85	25-50	8-25
	2-60	Silty clay loam, silt loam, gravelly loam.	CL	A-6, A-7	5-15	75-95	70-90	65-85	60-85	25-45	10-25
872B------------- Rapatee	0-18	Silty clay loam	ML	A-6, A-7	0	100	100	95-100	85-100	35-50	10-20
	18-48	Silty clay loam, silt loam.	CL-ML, ML, CL	A-4, A-6, A-7	0-10	100	75-100	70-100	65-95	25-50	5-20
	48-60	Clay loam, silty clay loam, loam.	ML, CL-ML, CL	A-4, A-6	0-15	95-100	65-90	60-85	55-80	15-40	2-20
2036C*: Tama------------	0-8	Silt loam--------	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	8-42	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	42-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
Urban land.											
2901B*: Ipava-----------	0-10	Silt loam--------	ML, CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	10-37	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	37-60	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
Urban land.											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
2901B*:											
Tama------------	0-13	Silt loam--------	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	13-47	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	47-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
2902A*:											
Ipava-----------	0-10	Silt loam--------	ML, CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	10-37	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	37-60	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
Urban land.											
Sable-----------	0-21	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	95-100	41-65	15-35
	21-44	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	44-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	30-40	10-20

* See description of the map ... composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
7D3 Atlas	0-11	30-40	1.45-1.65	0.06-0.2	0.18-0.20	4.5-7.3	High	0.32	2	7	.5-2
	11-60	35-45	1.50-1.70	<0.06	0.09-0.13	4.5-7.3	High	0.32			
8D2, 8E2, 8G Hickory	0-17	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37	5	6	1-2
	17-40	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate	0.37			
	40-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.37			
17 Keomah	0-12	16-22	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.37	5	6	1-2
	12-38	27-42	1.30-1.45	0.2-0.6	0.18-0.20	4.5-5.5	High	0.37			
	38-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-6.5	Moderate	0.37			
19C3, 19D3 Sylvan	0-8	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate	0.37	4	7	<1
	8-27	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.37			
	27-60	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low	0.37			
36B Tama	0-13	20-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.32	5	7	3-4
	13-47	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate	0.43			
	47-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43			
36B2, 36C2, 36D2 Tama	0-8	20-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.32	5	7	3-4
	8-42	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate	0.43			
	42-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43			
43A Ipava	0-10	20-30	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate	0.28	5	6	4-5
	10-37	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High	0.43			
	37-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	0.43			
45 Denny	0-19	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	3	6	3-4
	19-44	15-22	1.25-1.45	0.2-0.6	0.18-0.20	5.6-6.5	Low	0.37			
	44-60	35-45	1.20-1.40	0.06-0.2	0.11-0.22	5.6-6.5	High	0.37			
68 Sable	0-21	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate	0.28	5	6	5-6
	21-44	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate	0.28			
	44-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low	0.28			
74 Radford	0-26	18-27	1.40-1.60	0.6-2.0	0.22-0.24	6.1-7.8	Low	0.28	5	6	2-4
	26-60	24-35	1.35-1.55	0.6-2.0	0.18-0.20	6.6-7.8	Moderate	0.28			
77 Huntsville	0-27	18-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.8	Moderate	0.28	5	6	3-4
	27-52	18-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Moderate	0.28			
	52-60	10-25	1.20-1.50	0.6-2.0	0.17-0.21	5.6-7.8	Low	0.28			
81B Littleton	0-6	18-27	1.25-1.45	0.6-2.0	0.20-0.24	5.6-7.8	Low	0.32	5	6	3-4
	6-32	22-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.8	Low	0.32			
	32-60	18-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Low	0.43			
104 Virgil	0-13	15-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.8	Low	0.32	5	6	2-4
	13-47	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.1-7.8	Moderate	0.43			
	47-60	15-30	1.45-1.75	0.6-6.0	0.05-0.11	5.6-8.4	Low	0.28			
107+ Sawmill	0-25	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate	0.28	5	7	4-5
	25-38	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate	0.28			
	38-54	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate	0.28			
	54-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	7.4-8.4	Moderate	0.28			
119D2, 119E2 Elco	0-4	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.37	4	6	1-3
	4-22	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.3	Moderate	0.37			
	22-60	25-45	1.40-1.60	0.2-0.6	0.14-0.20	5.1-7.3	Moderate	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
131B, 131D, 131E-Alvin	0-20	10-15	1.45-1.65	2.0-6.0	0.14-0.20	5.1-6.5	Low----------	0.24	5	3	.5-1
	20-45	15-18	1.45-1.65	2.0-6.0	0.12-0.20	4.5-6.0	Low----------	0.24			
	45-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-7.8	Low----------	0.24			
134B, 134C2, 134D2-----------Camden	0-8	14-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-2
	8-32	22-35	1.35-1.55	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	32-44	18-30	1.45-1.65	0.6-2.0	0.15-0.25	5.6-7.3	Low----------	0.37			
	44-60	10-22	1.55-1.70	0.6-6.0	0.11-0.22	5.6-7.3	Low----------	0.37			
239--------------Dorchester	0-6	18-24	1.20-1.30	0.6-2.0	0.20-0.22	7.9-8.4	Low----------	0.37	5	6	.5-1
	6-60	18-30	1.25-1.40	0.6-2.0	0.22-0.24	6.6-7.8	Moderate-----	0.37			
249--------------Edinburg	0-16	25-35	1.10-1.30	0.6-2.0	0.21-0.24	5.6-7.8	High---------	0.37	4	6	3-4
	16-50	35-46	1.20-1.40	0.06-0.6	0.13-0.20	5.6-7.3	High---------	0.37			
	50-60	22-30	1.30-1.50	0.2-2.0	0.18-0.22	6.6-7.8	Moderate-----	0.37			
257--------------Clarksdale	0-10	20-27	1.25-1.50	0.6-2.0	0.22-0.24	5.1-6.0	Moderate-----	0.37	5	6	2-3
	10-42	35-42	1.30-1.50	0.2-0.6	0.11-0.20	5.1-7.3	High---------	0.37			
	42-60	20-30	1.40-1.60	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.37			
259C2, 259D2-----Assumption	0-9	20-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.32	4	6	3-4
	9-27	25-35	1.20-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	27-60	30-45	1.40-1.65	0.2-0.6	0.14-0.20	5.1-6.5	Moderate-----	0.43			
259D3------------Assumption	0-5	27-35	1.15-1.35	0.6-2.0	0.19-0.21	5.1-6.5	Moderate-----	0.43	3	7	1-2
	5-22	25-35	1.20-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	22-60	30-45	1.40-1.65	0.2-0.6	0.14-0.20	5.1-6.5	Moderate-----	0.43			
279B, 279C2------Rozetta	0-9	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
	9-53	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	53-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
280B, 280C2, 280D2, 280E-----Fayette	0-11	15-25	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	6	1-2
	11-60	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
344B-------------Harvard	0-7	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-3
	7-37	25-35	1.25-1.55	0.6-2.0	0.15-0.20	5.1-7.3	Moderate-----	0.43			
	37-45	15-35	1.30-1.60	0.6-2.0	0.12-0.19	5.6-7.8	Low----------	0.43			
	45-60	5-30	1.40-1.75	2.0-6.0	0.05-0.15	5.6-8.4	Very low-----	0.43			
386B-------------Downs	0-14	15-25	1.25-1.30	2.0-6.0	0.21-0.23	5.1-7.3	Low----------	0.32	5	6	2-3
	14-60	27-35	1.30-1.35	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.43			
415--------------Orion	0-4	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
	4-29	10-18	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
	29-57	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
	57-60	10-18	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
451--------------Lawson	0-31	10-20	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	5	3-5
	31-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
533*. Urban land											
536*. Dumps											
549D2, 549E, 549G------------Marseilles	0-6	20-27	1.20-1.40	0.6-2.0	0.20-0.24	5.1-6.5	Low----------	0.37	4	6	1-3
	6-34	27-42	1.35-1.60	0.06-0.2	0.09-0.20	4.5-6.5	Moderate-----	0.37			
	34-60	---	---	---	---	---	-------------	----			

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
567B2, 567C2----- Elkhart	0-8	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.32	4	7	1-3
	8-35	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	35-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
567D3------------ Elkhart	0-5	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.32	4	7	1-3
	5-28	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-8.4	Moderate-----	0.43			
	28-60	20-27	1.35-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.43			
660C2------------ Coatsburg	0-8	27-35	1.35-1.55	0.06-0.2	0.18-0.22	5.1-7.8	Moderate-----	0.37	2	6	2-4
	8-36	35-45	1.50-1.70	<0.06	0.09-0.13	5.1-6.5	High---------	0.37			
	36-60	20-35	1.55-1.75	0.06-0.2	0.15-0.19	5.6-7.8	Moderate-----	0.37			
801B, 802B. Orthents											
863*, 864*, 865*. Pits											
871B, 871D, 871G- Lenzburg	0-2	20-35	1.30-1.60	0.2-2.0	0.17-0.20	6.6-8.4	Moderate-----	0.37	5	4L	.5-4
	2-60	20-35	1.40-1.70	0.2-0.6	0.11-0.17	7.4-8.4	Moderate-----	0.37			
872B------------- Rapatee	0-18	27-35	1.30-1.60	0.2-0.6	0.10-0.20	6.1-7.3	Moderate-----	0.37	5	7	3-5
	18-48	15-35	1.50-1.90	0.06-0.6	0.08-0.15	6.6-8.4	Moderate-----	0.37			
	48-60	15-35	1.55-2.25	<0.06	0.03-0.18	6.6-8.4	Low----------	0.37			
2036C*: Tama------------	0-8	20-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	3-4
	8-42	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	42-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
Urban land.											
2901B*: Ipava-----------	0-10	20-30	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	10-37	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	37-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
Urban land.											
Tama------------	0-13	20-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	3-4
	13-47	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	47-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
2902A*: Ipava-----------	0-10	20-30	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	10-37	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	37-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
Urban land.											
Sable-----------	0-21	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	6	5-6
	21-44	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
	44-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.28			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
7D3 Atlas	D	None	---	---	0-2.0	Perched	Apr-Jun	High	High	Moderate.
8D2, 8E2, 8G Hickory	C	None	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
17 Keomah	C	None	---	---	2.0-4.0	Apparent	Nov-Jul	High	High	Moderate.
19C3, 19D3 Sylvan	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
36B, 36B2, 36C2, 36D2 Tama	B	None	---	---	4.0-6.0	Apparent	Nov-Jun	High	Moderate	Moderate.
43A Ipava	B	None	---	---	1.0-3.0	Apparent	Mar-May	High	High	Moderate.
45 Denny	D	None	---	---	+.5-2.0	Apparent	Mar-May	High	High	Moderate.
68 Sable	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	High	Low.
74 Radford	B	Occasional	Brief	Mar-May	1.0-3.0	Apparent	Mar-Jun	High	High	Low.
77 Huntsville	B	Occasional	Very brief to brief.	Jan-May	>6.0	---	---	High	Low	Low.
81B Littleton	B	None	---	---	1.0-3.0	Apparent	Apr-Jun	High	High	Low.
104 Virgil	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
107+ Sawmill	B/D	Frequent	Brief	Mar-Jun	0-2.0	Apparent	Mar-Jun	High	High	Low.
119D2, 119E2 Elco	B	None	---	---	2.5-4.5	Perched	Mar-May	High	High	Moderate.
131B, 131D, 131E Alvin	B	None	---	---	>6.0	---	---	Moderate	Low	High.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
134B, 134C2, 134D2 Camden	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	High	Low	Moderate.
239 Dorchester	B	Occasional	Very brief to brief.	Mar-May	>6.0	---	---	High	High	Low.
249 Edinburg	C	None	---	---	+.5-2.0	Apparent	Mar-Jun	High	High	Moderate.
257 Clarksdale	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	High	High	Moderate.
259C2, 259D2, 259D3 Assumption	B	None	---	---	3.0-4.5	Perched	Feb-May	High	High	Moderate.
279B, 279C2 Rozetta	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	High	Moderate	Moderate.
280B, 280C2, 280D2, 280E Fayette	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
344B Harvard	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
386B Downs	B	None	---	---	4.0-6.0	Apparent	Mar-Jun	High	Moderate	Moderate.
415 Orion	C	Frequent	Brief	Mar-May	1.0-3.0	Apparent	Nov-May	High	High	Low.
451 Lawson	C	Occasional	Brief to long.	Mar-May	1.0-3.0	Apparent	Nov-May	High	Moderate	Low.
533*. Urban land										
536*. Dumps										
549D2, 549E, 549G Marseilles	B	None	---	---	>6.0	---	---	High	High	Moderate.
567B2, 567C2, 567D3 Elkhart	B	None	---	---	>6.0	---	---	High	Moderate	Moderate.
660C2 Coatsburg	D	None	---	---	0-1.0	Perched	Apr-Jun	High	High	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
801B, 802B. Orthents										
863*, 864*, 865*. Pits										
871B, 871D, 871G-- Lenzburg	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	Low.
872B-------------- Rapatee	D	None--------	---	---	>6.0	---	---	High-----	Moderate	Low.
2036C*:										
Tama-------------	B	None--------	---	---	4.0-6.0	Apparent	Nov-Jun	High-----	Moderate	Moderate.
Urban land.										
2901B*:										
Ipava------------	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
Urban land.										
Tama-------------	B	None--------	---	---	4.0-6.0	Apparent	Nov-Jun	High-----	Moderate	Moderate.
2902A*:										
Ipava------------	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
Urban land.										
Sable------------	B/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

[Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified]

Soil name and location	Sample number	Horizon	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ft3	Pct					Pct			
Elco silt loam:	S78IL-095-24-1	Ap	0-4	96	23	100	100	100	98	40	13	A-7-6	ML
1,914 feet east and	S78IL-095-24-4	Bt3	16-22	103	20	100	100	99	95	38	20	A-6	CL
2,500 feet south of the	S78IL-095-24-5	Btg1	22-35	100	20	100	100	99	93	44	26	A-7-6	CL
northwest corner of sec.													
35, T. 12 N., R. 4 E.													
Ipava silt loam:	S78IL-095-16-1	Ap	0-10	101	23	100	100	99	98	33	12	A-6	CL
2,046 feet west and 594	S78IL-095-16-4	Bt	24-31	96	24	100	100	100	99	53	31	A-7-6	CH
feet north of the	S78IL-095-16-7	Cg	50-60	112	16	100	100	100	100	33	11	A-6	CL
southeast corner of sec.													
25, T. 13 N., R. 2 E.													
Keomah silt loam:	S78IL-095-3-1	Ap	0-6	103	18	100	99	95	92	28	4	A-4	ML
2,440 feet west and 200	S78IL-095-3-4	Btg1	17-26	95	21	100	100	100	99	51	31	A-7-6	CH
feet north of the	S78IL-095-3-7	Cg	48-60	107	19	100	100	100	99	39	19	A-6	CL
southeast corner of sec.													
26, T. 12 N., R. 3 E.													
Lenzburg silty clay loam:	S77IL-095-77-1	Ap	0-2	90	26	99	98	95	84	50	12	A-7-5	OH
165 feet east and 2,211	S77IL-095-77-2	C1	2-17	---	---	90	80	73	62	33	11	A-6	CL
feet south of the	S77IL-095-77-3	C2	17-60	---	---	89	83	78	69	32	11	A-6	CL
northwest corner of sec.													
29, T. 9 N., R. 4 E.													
Marseilles silt loam:	S78IL-095-61-1	A	0-6	109	19	99	98	95	80	39	10	A-4	ML
750 feet east and 132	S78IL-095-61-4	Bt2	14-22	99	23	100	99	98	94	39	14	A-6	CL
feet south of the	S78IL-095-61-7	Cr	34-60	114	17	100	99	98	91	35	12	A-6	CL
northwest corner of sec.													
27, T. 12 N., R. 4 E.													
Rapatee silty clay loam:	S79IL-095-33-1	A1	0-23	98	22	100	100	99	99	38	19	A-6	CL
2,200 feet north and 660	S79IL-095-33-2	C1	23-42	109	17	100	100	99	97	34	14	A-6	CL
feet west of the	S79IL-095-33-3	C2	42-60	107	20	99	98	97	94	45	22	A-7-6	CL
southeast corner of sec.													
11, T. 12 N., R. 3 E.													
Rozetta silt loam:	S78IL-095-6-1	Ap	0-9	107	18	100	100	99	98	30	6	A-4	ML
1,089 feet west and	S78IL-095-6-4	Bt3	18-28	99	23	100	100	100	100	46	24	A-7-6	CL
2,444 feet north of the	S78IL-095-6-7	C	53-60	111	16	100	100	100	100	31	10	A-4	CL
southeast corner of sec.													
33, T. 12 N., R. 3 E.													

TABLE 19.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
*Assumption	Fine-silty, mixed, mesic Typic Argiudolls
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Clarksdale	Fine, montmorillonitic, mesic Udollic Ochraqualfs
Coatsburg	Fine, montmorillonitic, mesic, sloping Typic Argiaquolls
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs
Dorchester	Fine-silty, mixed (calcareous), mesic Typic Udifluvents
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
Edinburg	Fine, montmorillonitic, mesic Typic Argiaquolls
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
*Elkhart	Fine-silty, mixed, mesic Typic Argiudolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Harvard	Fine-silty, mixed, mesic Mollic Hapludalfs
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Lenzburg	Fine-loamy, mixed (calcareous), mesic Typic Udorthents
Littleton	Fine-silty, mixed, mesic Cumulic Hapludolls
Marseilles	Fine-silty, mixed, mesic Typic Hapludalfs
*Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Loamy, mixed, mesic Udorthents
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Rapatee	Fine-silty, mixed, nonacid, mesic Typic Udorthents
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Virgil	Fine-silty, mixed, mesic Udollic Ochraqualfs

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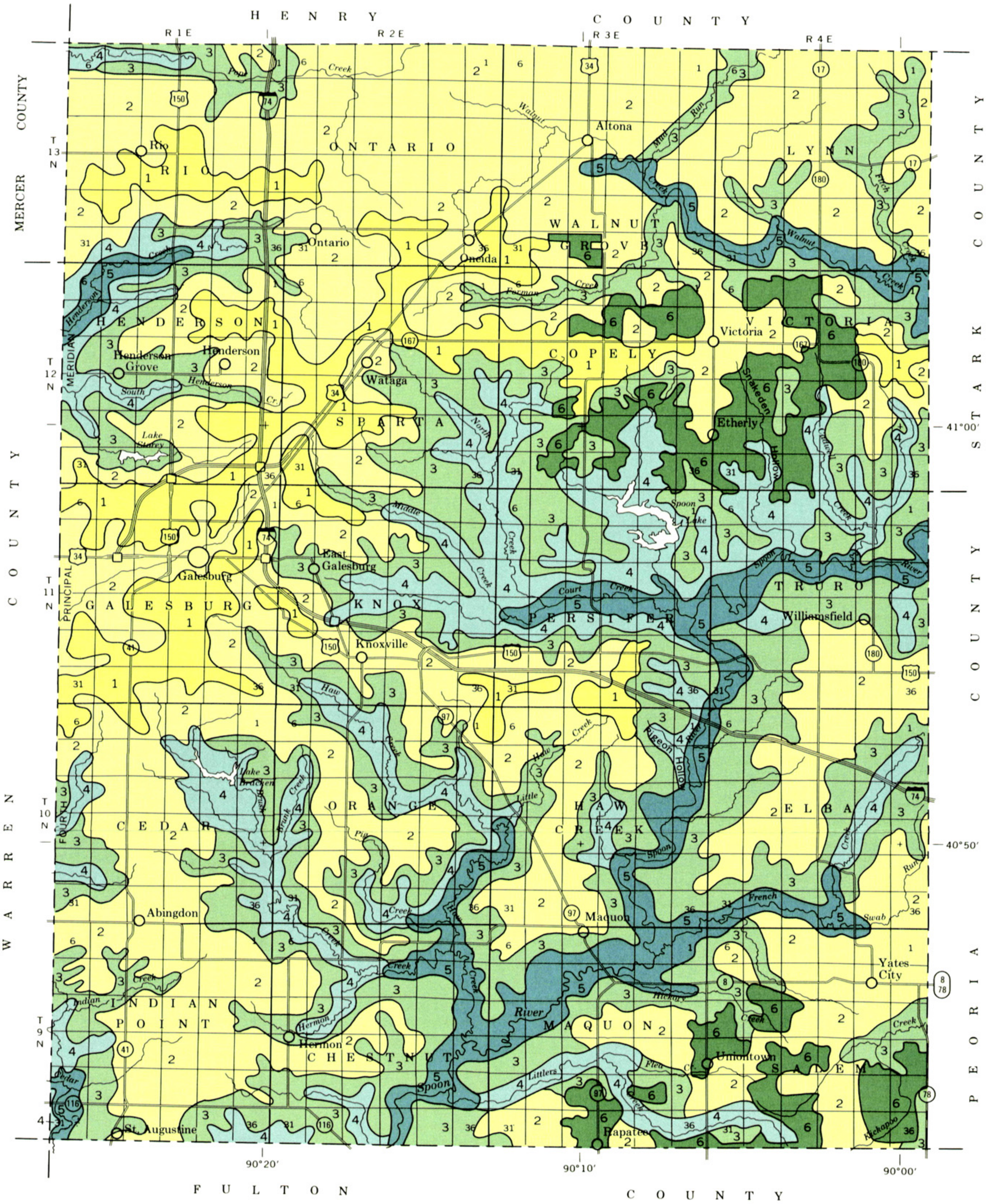


LEGEND

1	IPAVA-SABLE association: Nearly level, somewhat poorly drained and poorly drained soils formed in loess on uplands
2	TAMA-IPAVA association: Strongly sloping to nearly level, moderately well drained and somewhat poorly drained soils formed in loess on uplands
3	ROZETTA-CLARKSDALE-ELCO association: Nearly level to steep, moderately well drained and somewhat poorly drained soils formed in loess and in loess and glacial till; on uplands
4	HICKORY-MARSEILLES association: Strongly sloping to very steep, well drained soils formed in glacial till and in material weathered from shale and siltstone; on uplands
5	LAWSON-SAWMILL-HUNTSVILLE association: Nearly level, somewhat poorly drained, poorly drained, and well drained soils formed in alluvium on bottom land
6	LENZBURG-RAPATEE association: Gently sloping to very steep, well drained soils formed in loamy mine spoil or in silty soil material underlain by mine spoil; on uplands

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

N

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

KNOX COUNTY, ILLINOIS

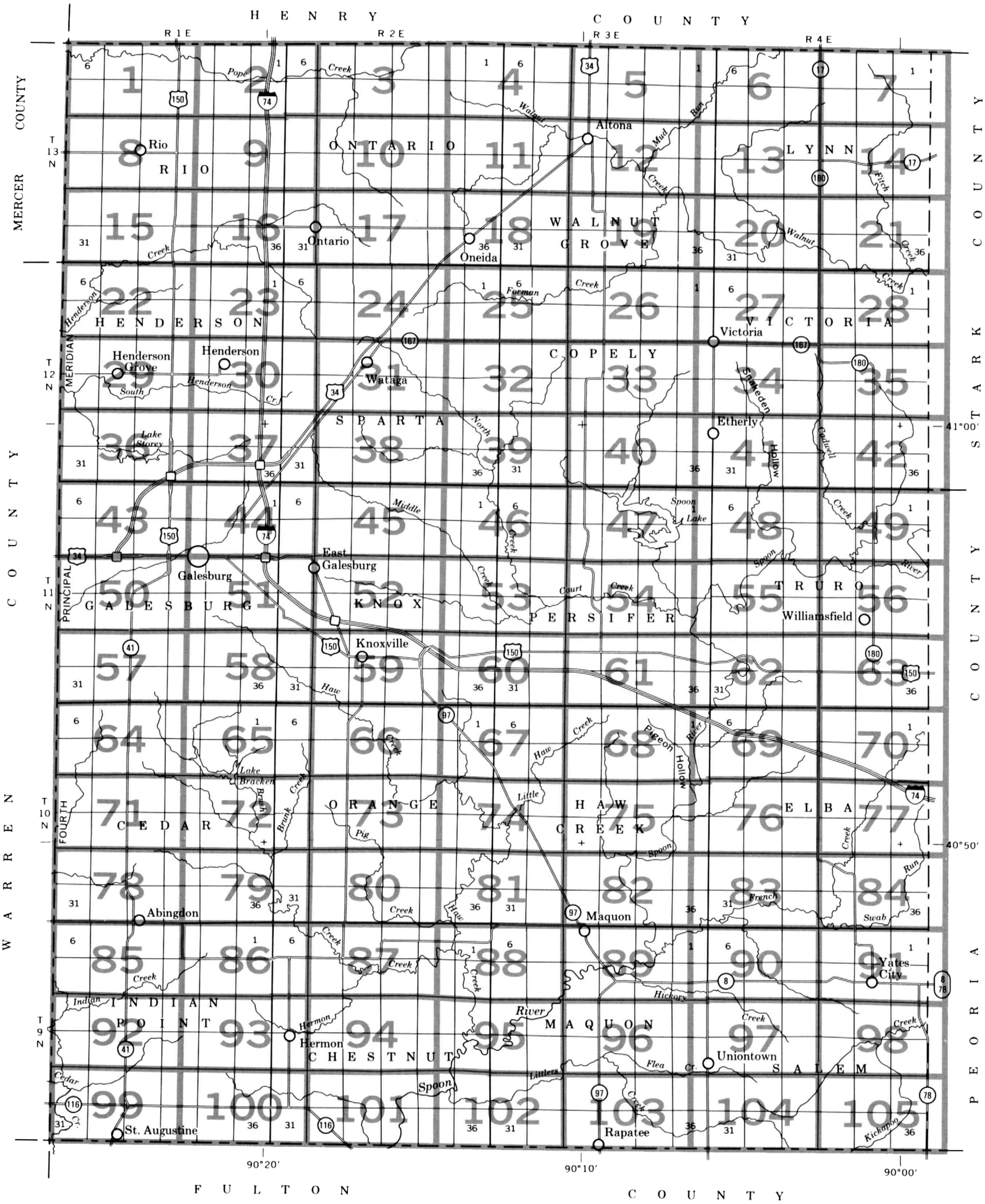
Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

COMPILED 1983



SECTIONALIZED TOWNSHIP					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

N

INDEX TO MAP SHEETS

KNOX COUNTY, ILLINOIS

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded and 3 that it is severely eroded.

SYMBOL	NAME
7D3	Atlas silty clay loam, 10 to 18 percent slopes, severely eroded
8D2	Hickory silt loam, 10 to 15 percent slopes, eroded
8E2	Hickory silt loam, 15 to 30 percent slopes, eroded
8G	Hickory loam, 30 to 50 percent slopes
17	Keomah silt loam
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded
36B	Tama silt loam, 1 to 4 percent slopes
36B2	Tama silty clay loam, 2 to 5 percent slopes, eroded
36C2	Tama silty clay loam, 5 to 10 percent slopes, eroded
36D2	Tama silty clay loam, 10 to 15 percent slopes, eroded
43A	Ipava silt loam, 0 to 3 percent slopes
45	Denny silt loam
68	Sable silty clay loam
74	Radford silt loam
77	Huntsville silt loam
81B	Littleton silt loam, 1 to 3 percent slopes
104	Virgil silt loam
107 +	Sawmill silty clay loam, overwash
119D2	Elco silt loam, 8 to 15 percent slopes, eroded
119E2	Elco silt loam, 15 to 20 percent slopes, eroded
131B	Alvin sandy loam, 2 to 6 percent slopes
131D	Alvin sandy loam, 8 to 15 percent slopes
131E	Alvin sandy loam, 15 to 30 percent slopes
134B	Camden silt loam, 2 to 5 percent slopes
134C2	Camden silt loam, 5 to 10 percent slopes, eroded
134D2	Camden silt loam, 10 to 18 percent slopes, eroded
239	Dorchester silt loam
249	Edinburg silty clay loam
257	Clarksdale silt loam
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded
259D2	Assumption silt loam, 10 to 15 percent slopes, eroded
259D3	Assumption silty clay loam, 8 to 15 percent slopes, severely eroded
279B	Rozetta silt loam, 1 to 5 percent slopes
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded
280B	Fayette silt loam, 2 to 5 percent slopes
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded
280E	Fayette silt loam, 15 to 25 percent slopes
344B	Harvard silt loam, 1 to 5 percent slopes
386B	Downs silt loam, 2 to 6 percent slopes
415	Orion silt loam
451	Lawson silt loam
533	Urban land
536	Dumps, mine
549D2	Marseilles silt loam, 10 to 15 percent slopes, eroded
549E	Marseilles silt loam, 15 to 30 percent slopes
549G	Marseilles silt loam, 30 to 60 percent slopes
567B2	Elkhart silty clay loam, 3 to 5 percent slopes, eroded
567C2	Elkhart silty clay loam, 5 to 10 percent slopes, eroded
567D3	Elkhart silty clay loam, 8 to 15 percent slopes, severely eroded
660C2	Coatsburg silty clay loam, 5 to 12 percent slopes, eroded
801B	Orthents, silty, gently sloping
802B	Orthents, loamy, gently sloping
863	Pits, clay
864	Pits, quarries
865	Pits, gravel
871B	Lenzburg silty clay loam, 1 to 7 percent slopes
871D	Lenzburg silt loam, 10 to 20 percent slopes
871G	Lenzburg loam, 20 to 70 percent slopes
872B	Rapatee silty clay loam, 1 to 7 percent slopes
2036C	Tama-Urban land complex, 3 to 10 percent slopes
2901B	Ipava-Urban land-Tama complex, 1 to 5 percent slopes
2902A	Ipava-Urban land-Sable complex, 0 to 3 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County or parish
- Reservation (national forest or park, state forest or park, and large airport)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery — Davis Airstrip

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52

RAILROAD

DAMS

- Large (to scale)
- Medium or small — water, w

PITS

- Gravel pit

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w

MISCELLANEOUS WATER FEATURES

- Marsh or swamp

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 36C2, 45

ESCARPMENTS

- Other than bedrock (points down slope)

SHORT STEEP SLOPE

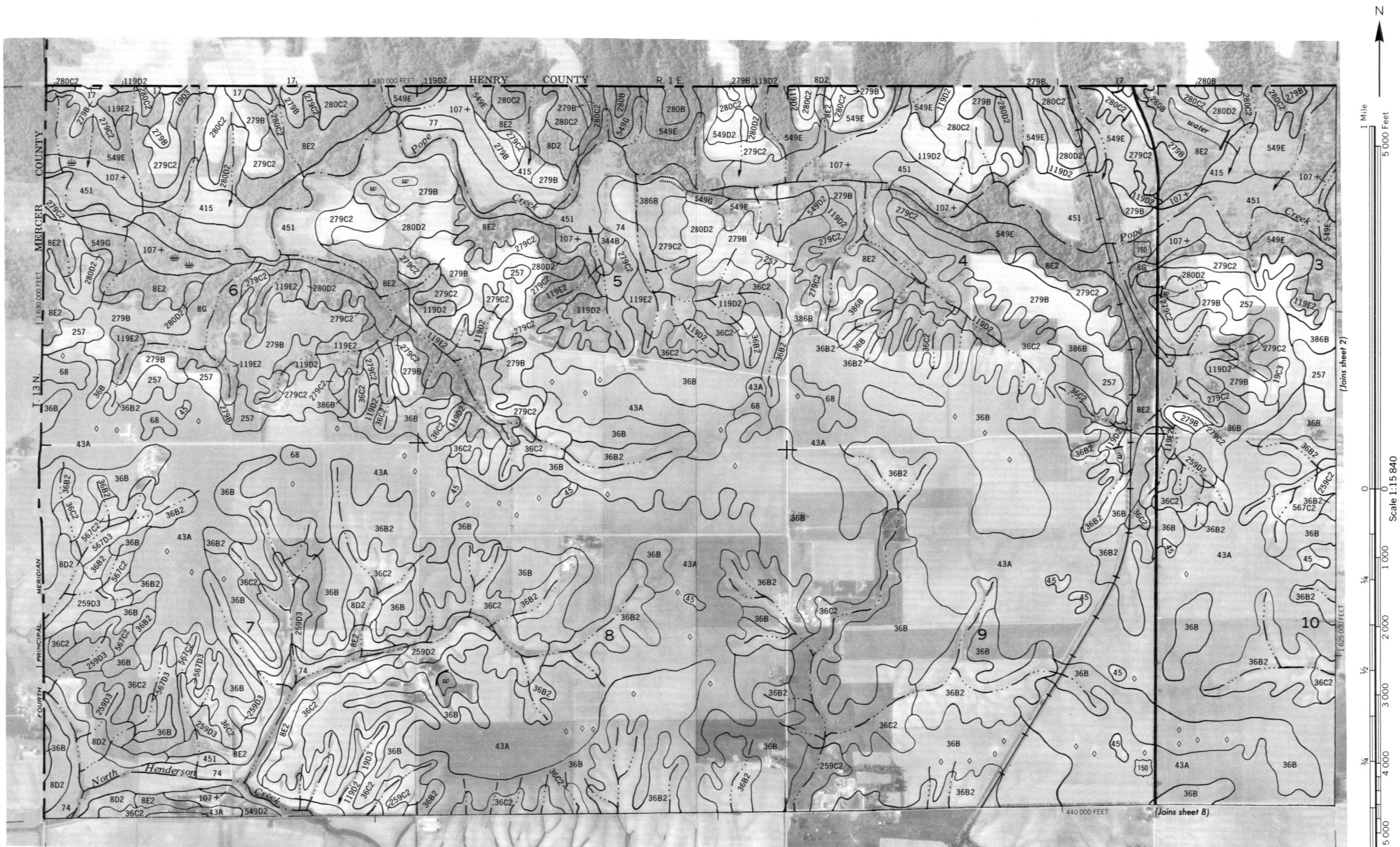
DEPRESSION OR SINK

SOIL SAMPLE SITE — S

MISCELLANEOUS

- Gravelly spot
- Sandy spot
- Severely eroded spot

1



KNOX COUNTY, ILLINOIS NO. 1

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

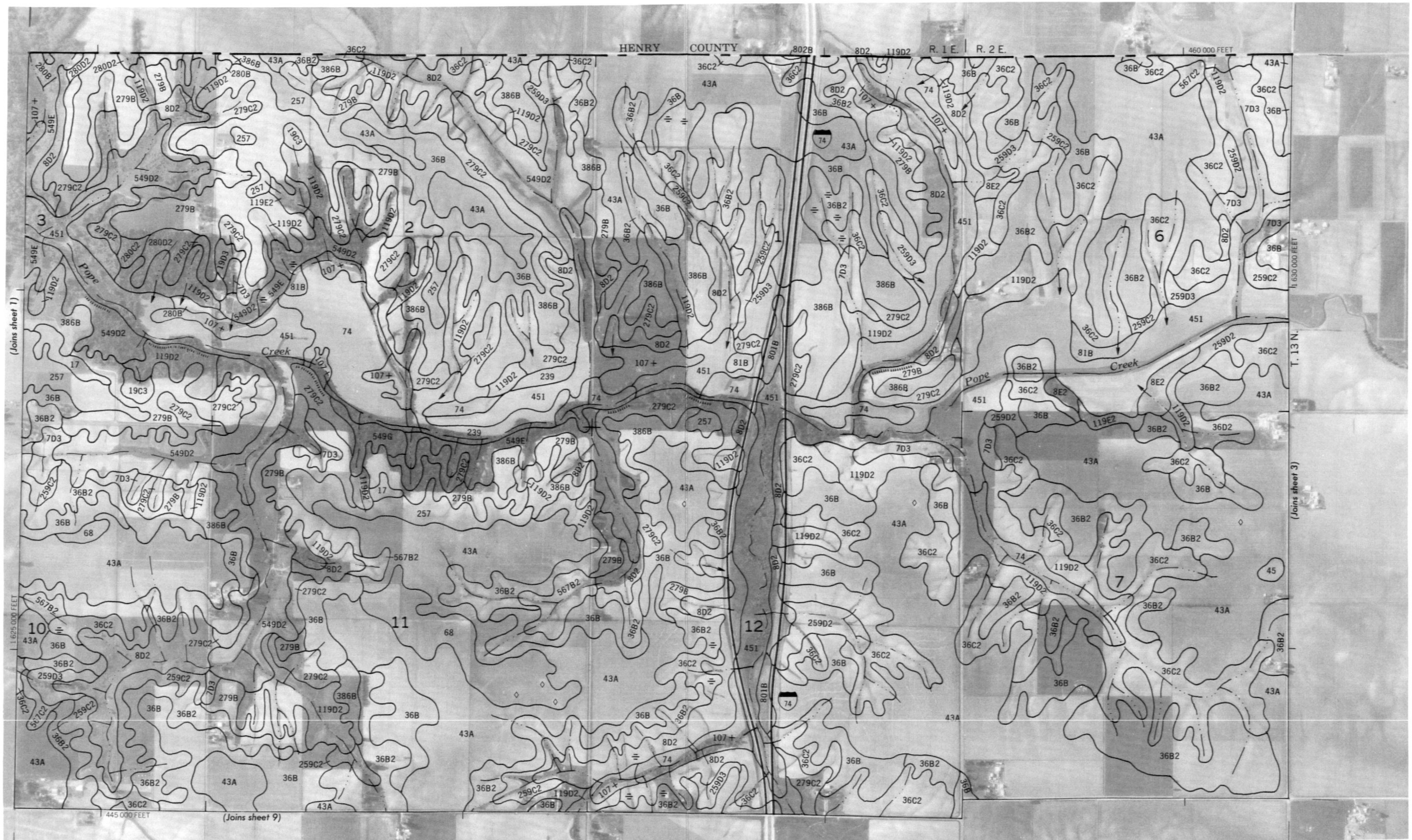
N

1 Mile

5 000 Feet

Scale 1:15 840

0

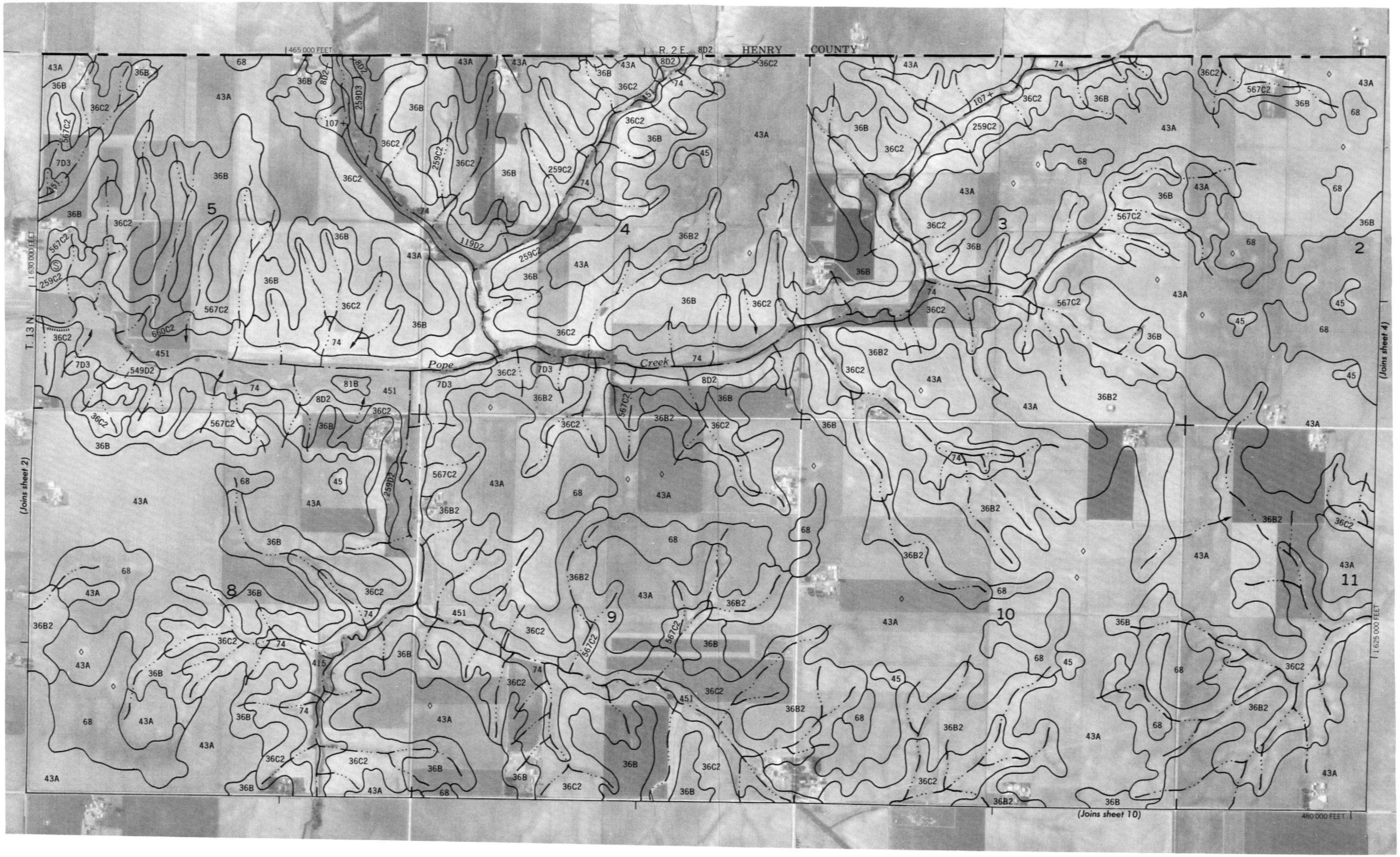


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 2

3

N



1 Mile

5 000 Feet

Scale 1:15 840

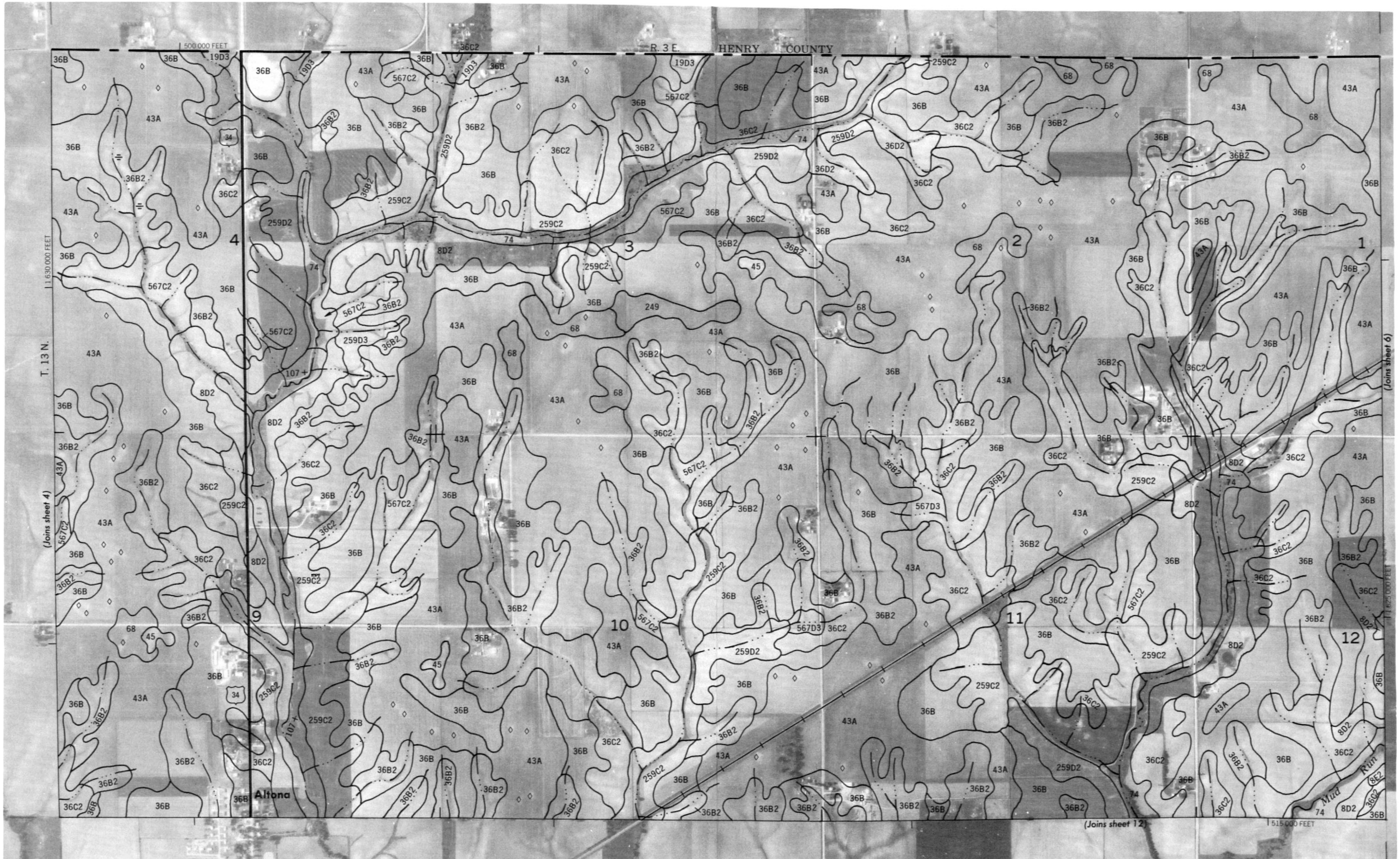
0 1 000 ¼ 2 000 ½ 3 000 ¾ 4 000 5 000

KNOX COUNTY, ILLINOIS NO. 3

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5



N

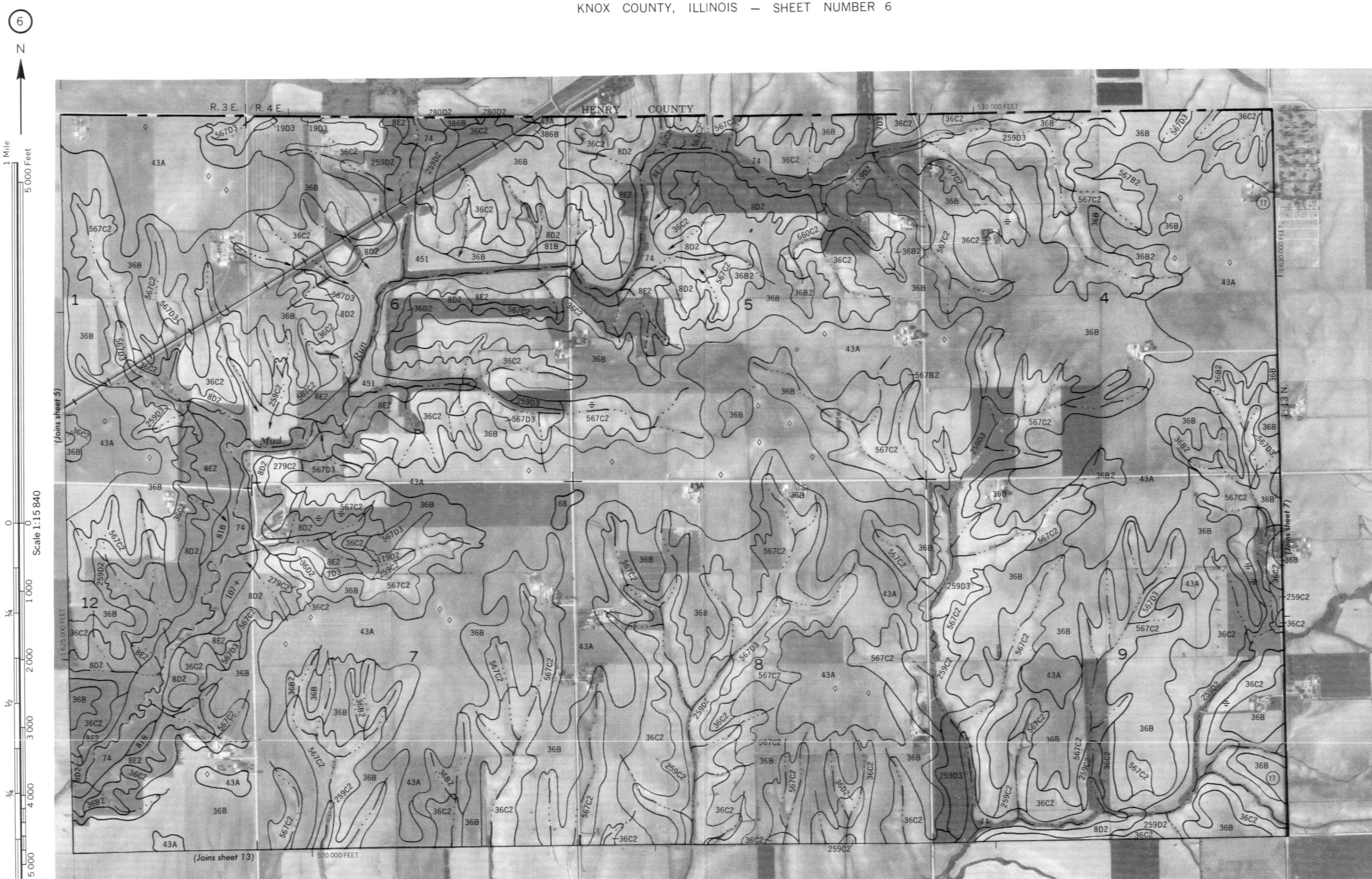
Scale 1:15 840

1 Mile

5 000 Feet

KNOX COUNTY, ILLINOIS NO. 5

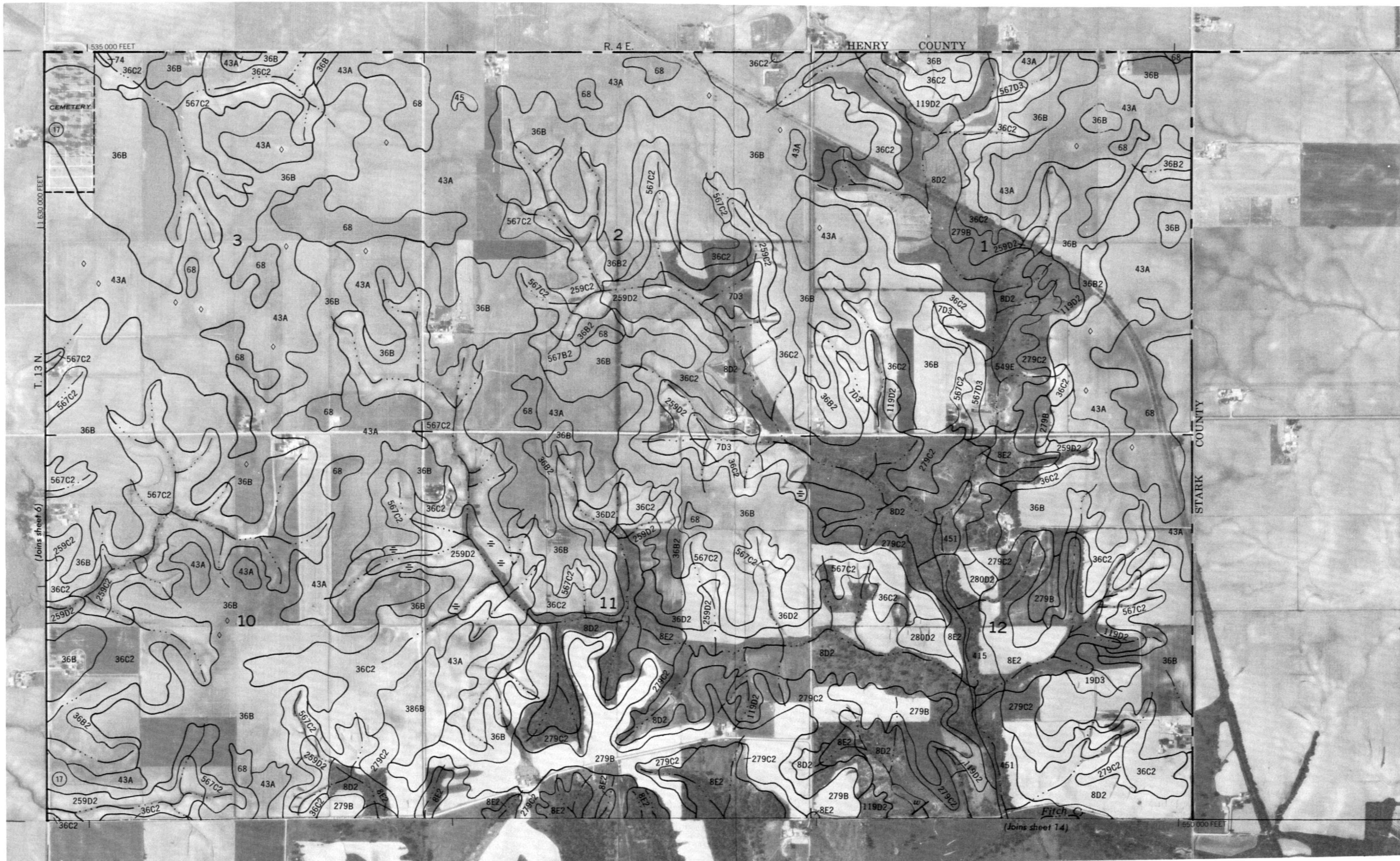
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

7

N



KNOX COUNTY, ILLINOIS NO. 7

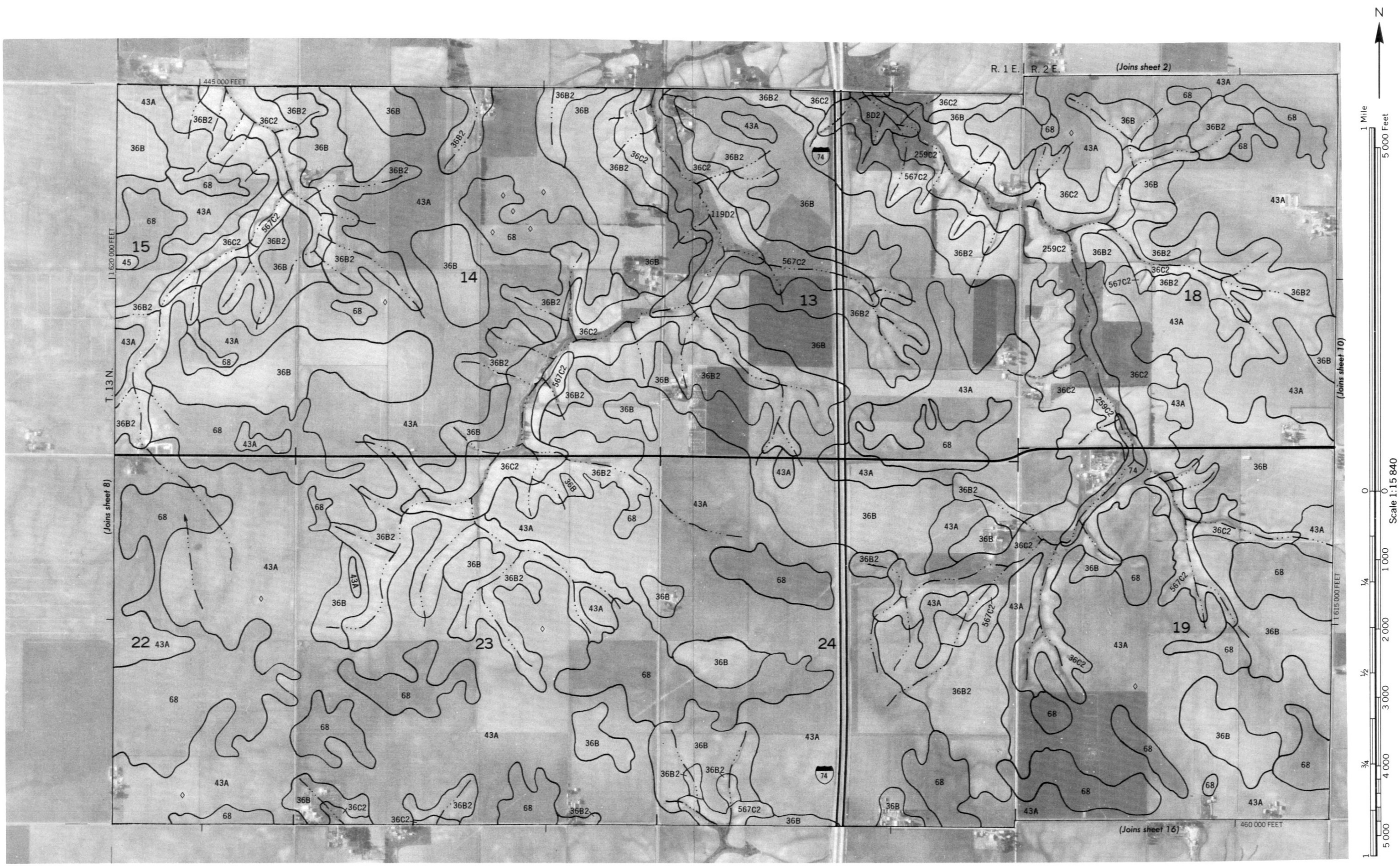
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 Mile · 5 000 Feet · 0 · 1000 · 2000 · 3000 · 4000 · 5000 · 0 · ¼ · ½ · ¾ · 1

Scale 1:15 840

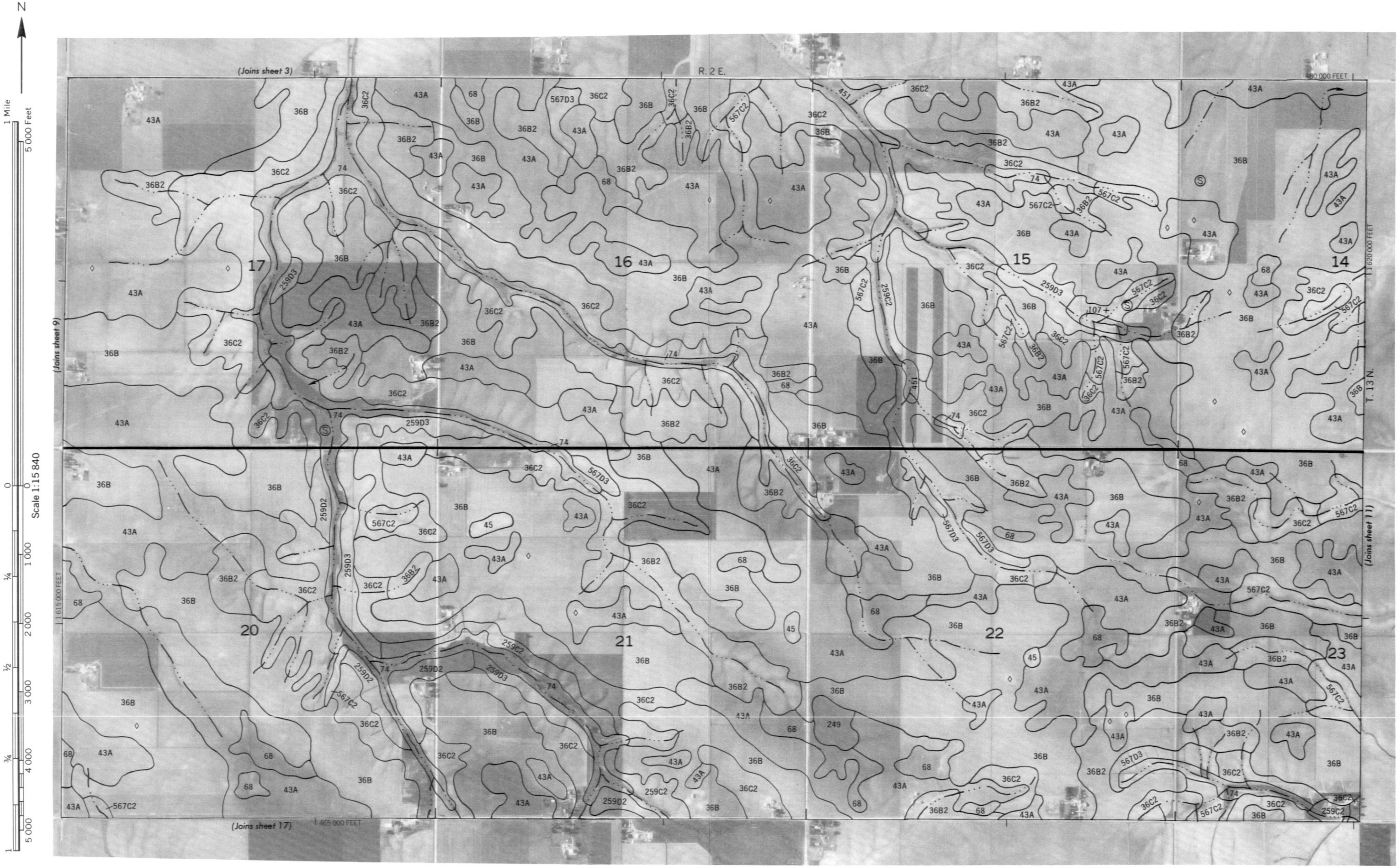
KNOX COUNTY, ILLINOIS NO. 8

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



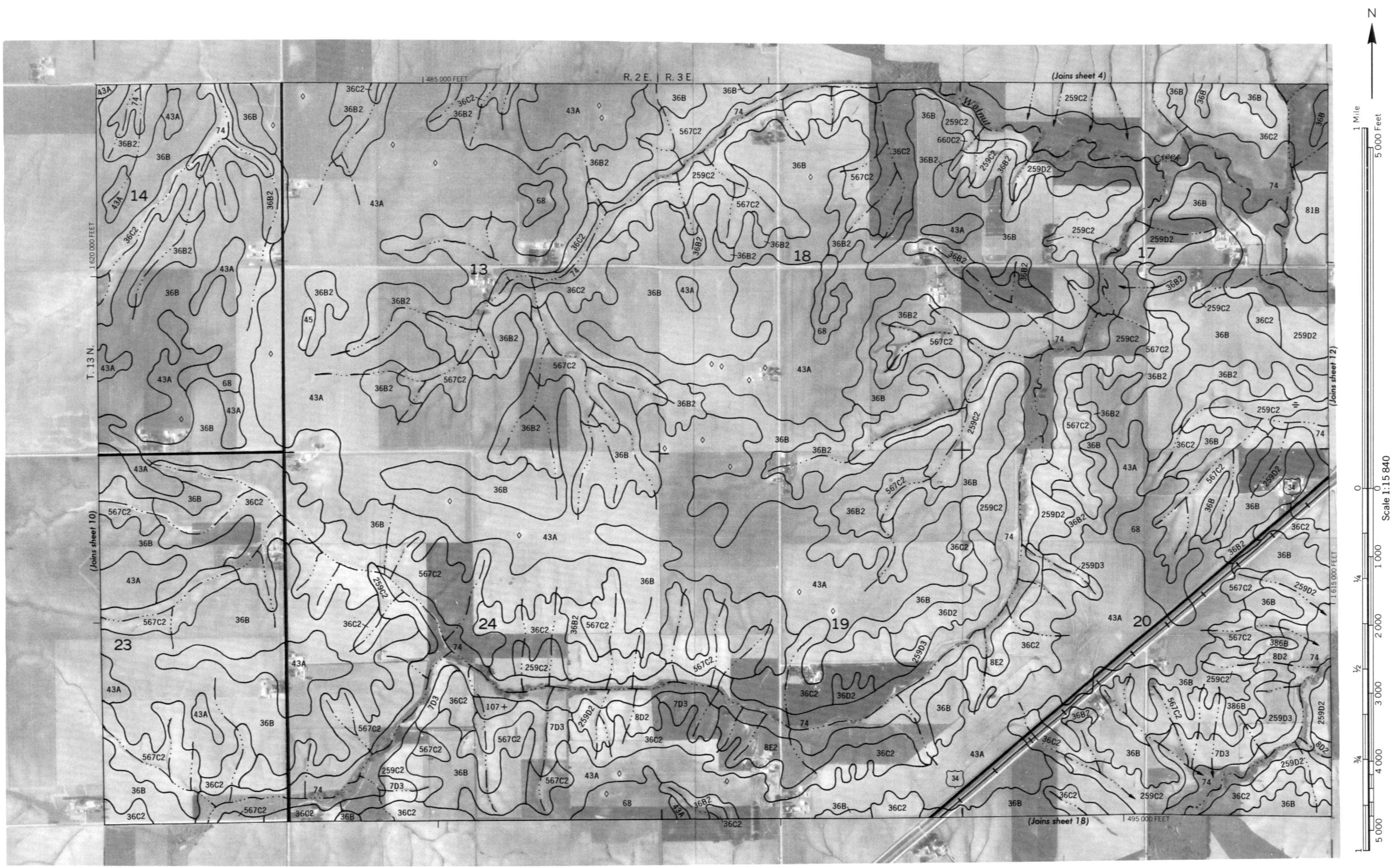
KNOX COUNTY, ILLINOIS NO. 9

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 10



KNOX COUNTY, ILLINOIS NO. 11

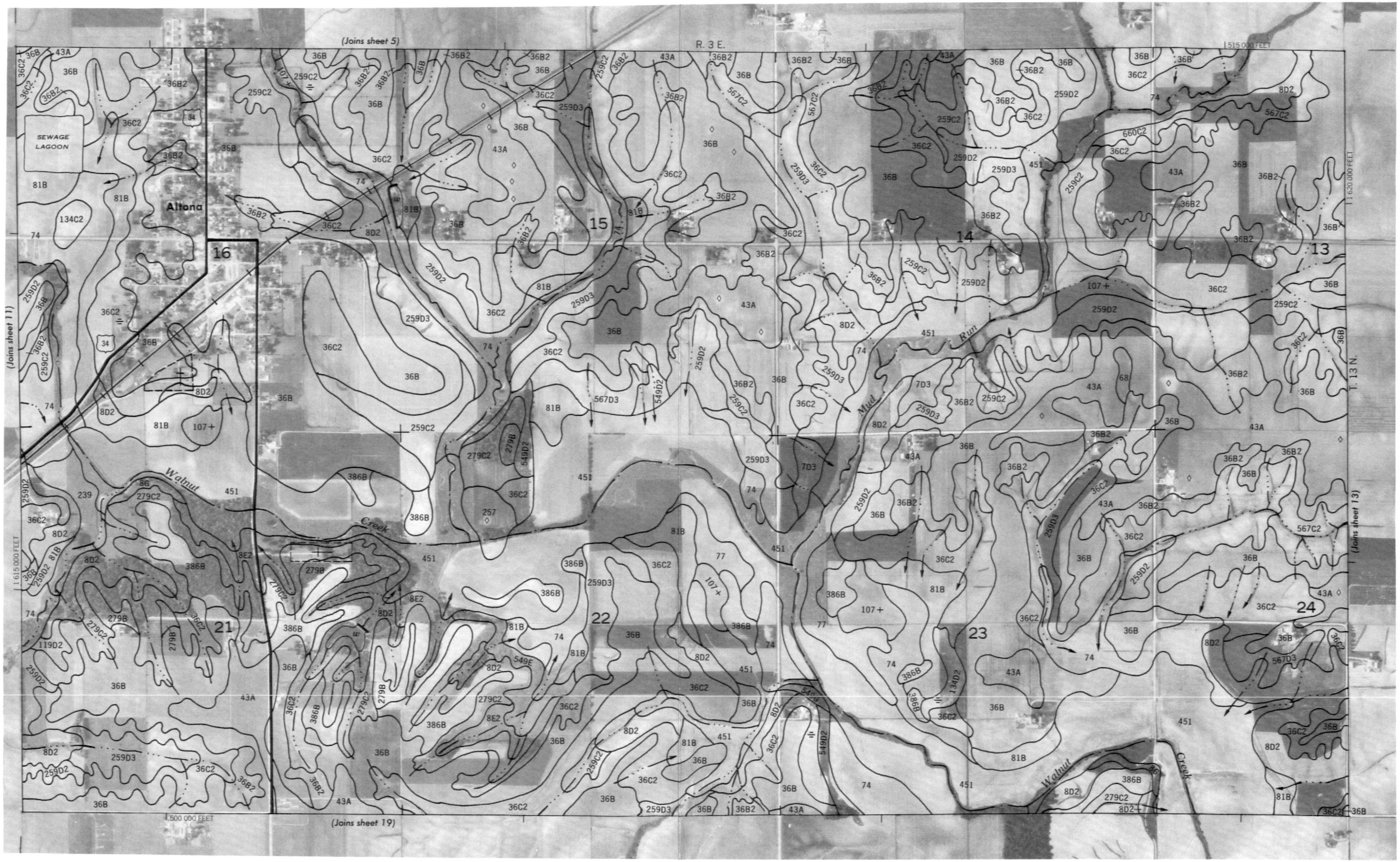
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

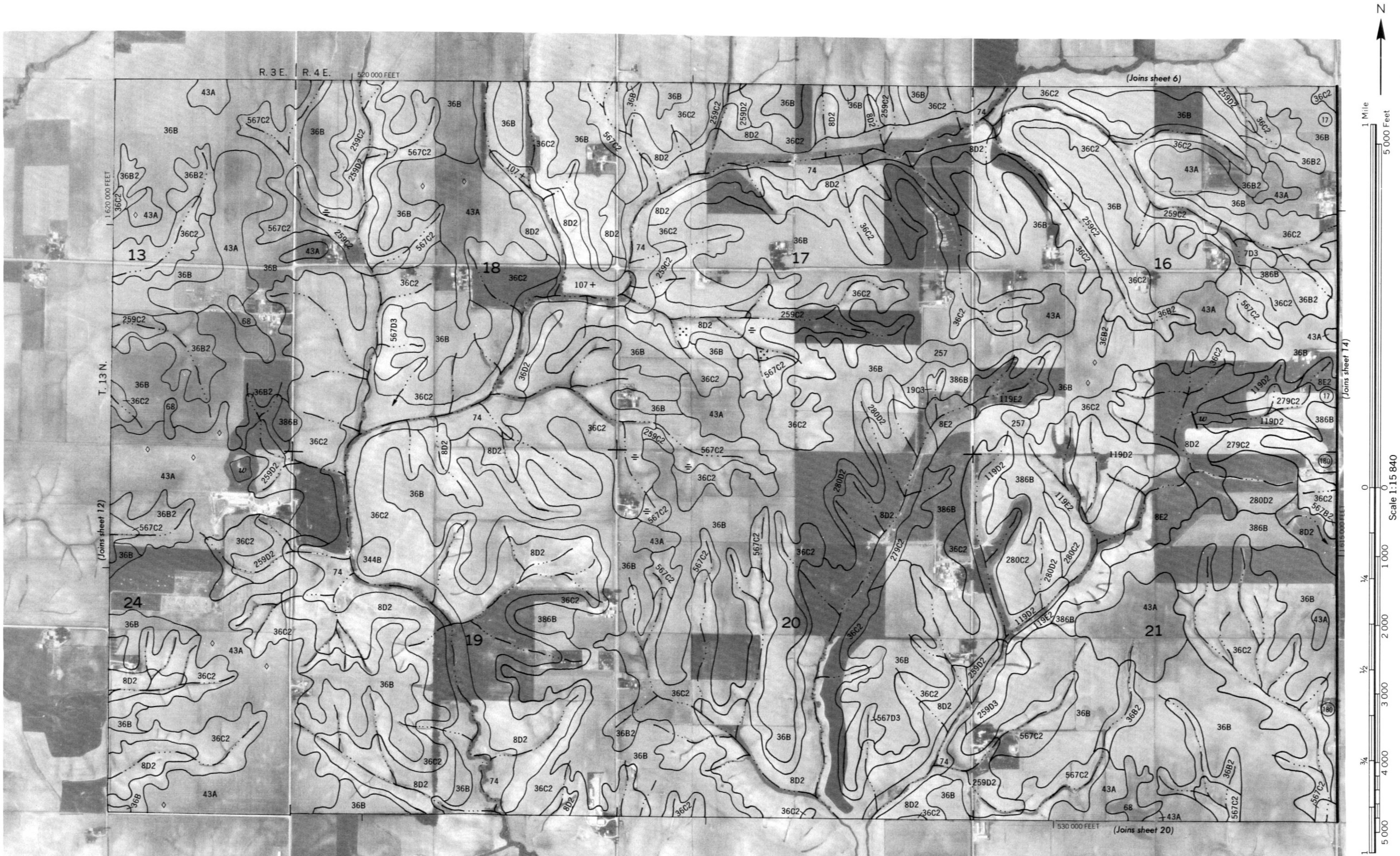
1 Mile

5 000 Feet

Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



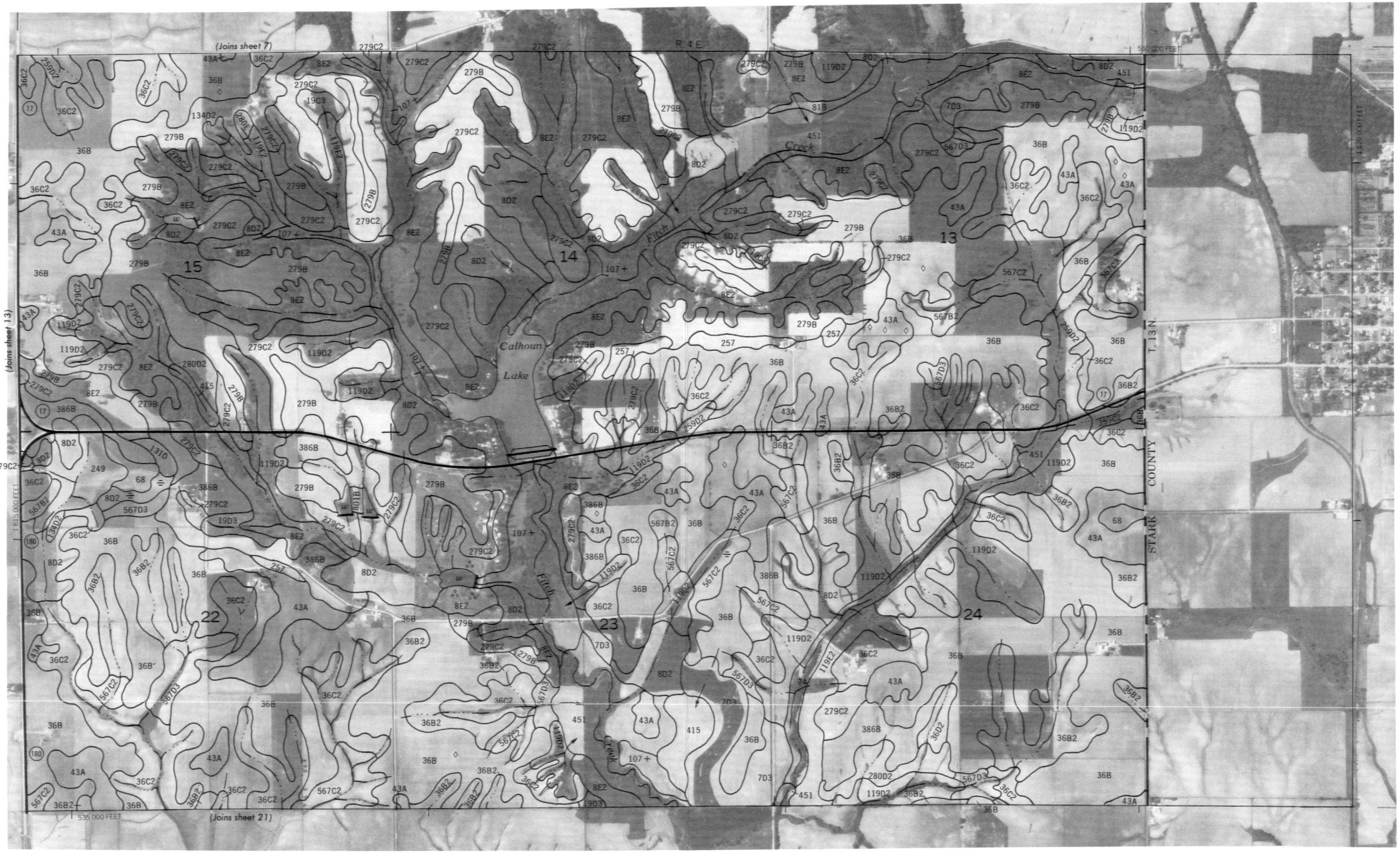
KNOX COUNTY, ILLINOIS NO. 13

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

14

N

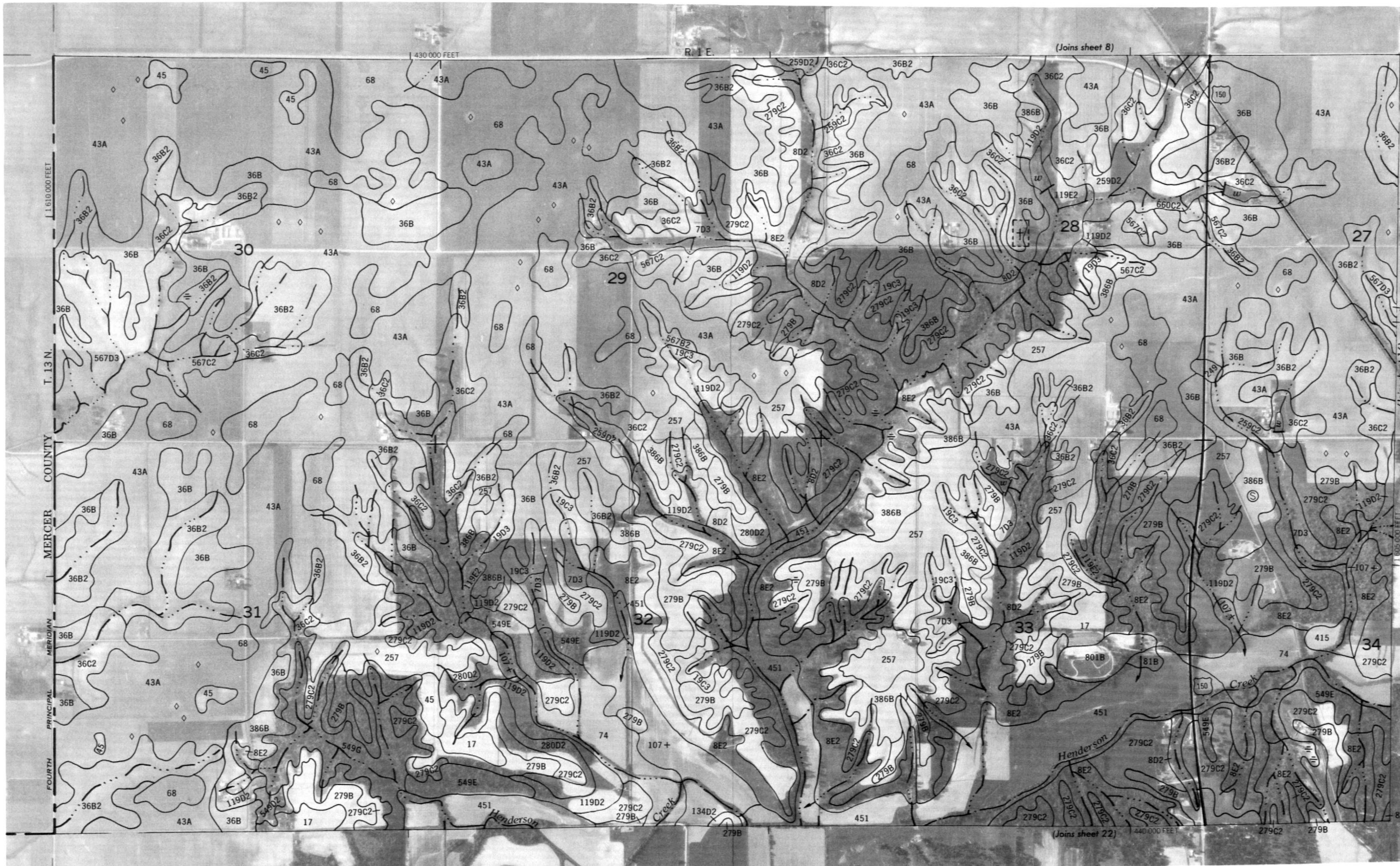
1 Mile
5 000 Feet
Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

15

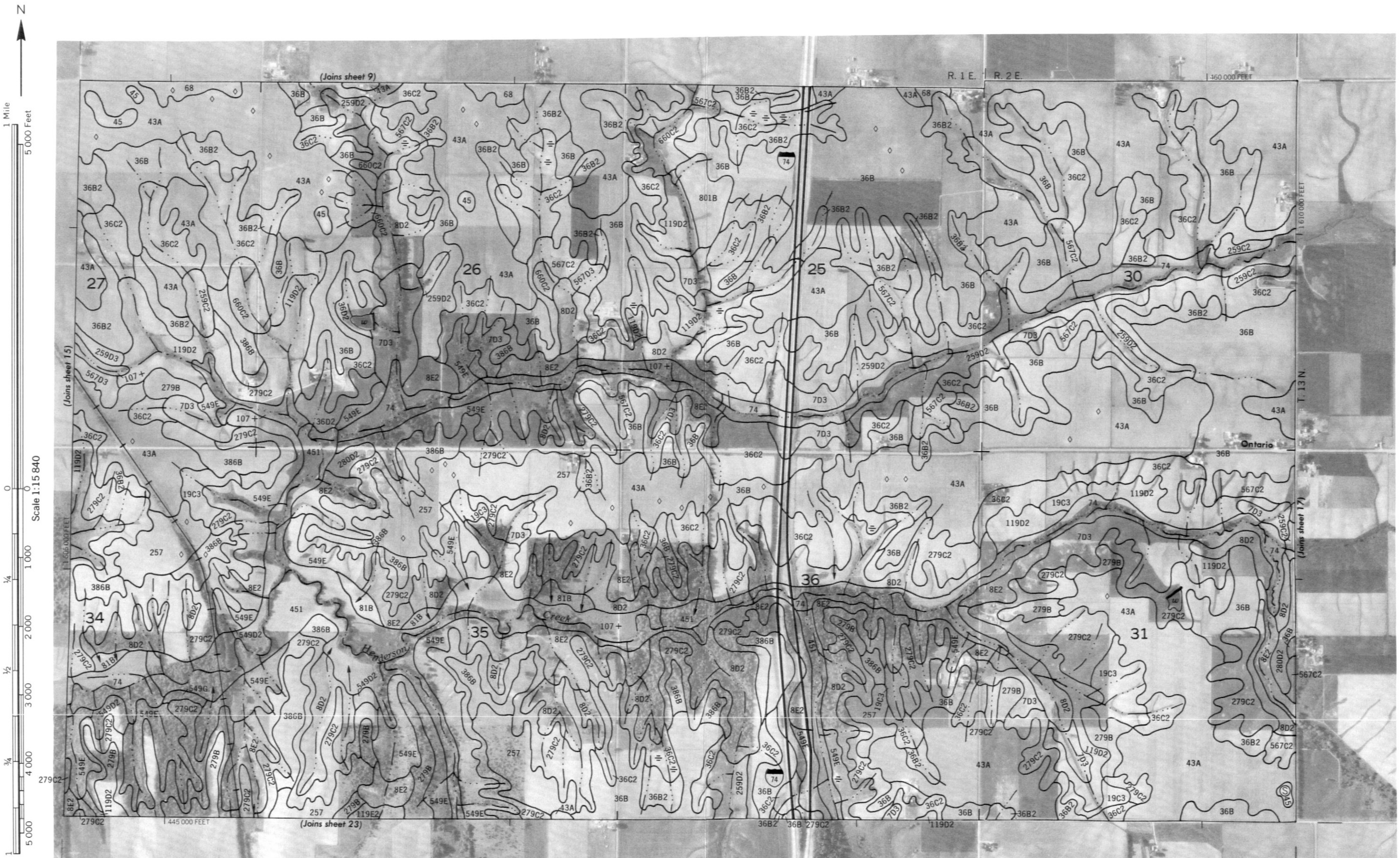
N



1 Mile
5 000 Feet
0
1/4
1/2
3/4
1
0
1000
2000
3000
4000
5000
Scale 1:15 840

KNOX COUNTY, ILLINOIS NO. 15

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale 1:15 840

1 Mile
5 000 Feet
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

KNOX COUNTY, ILLINOIS NO. 17

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS — SHEET NUMBER 18

N

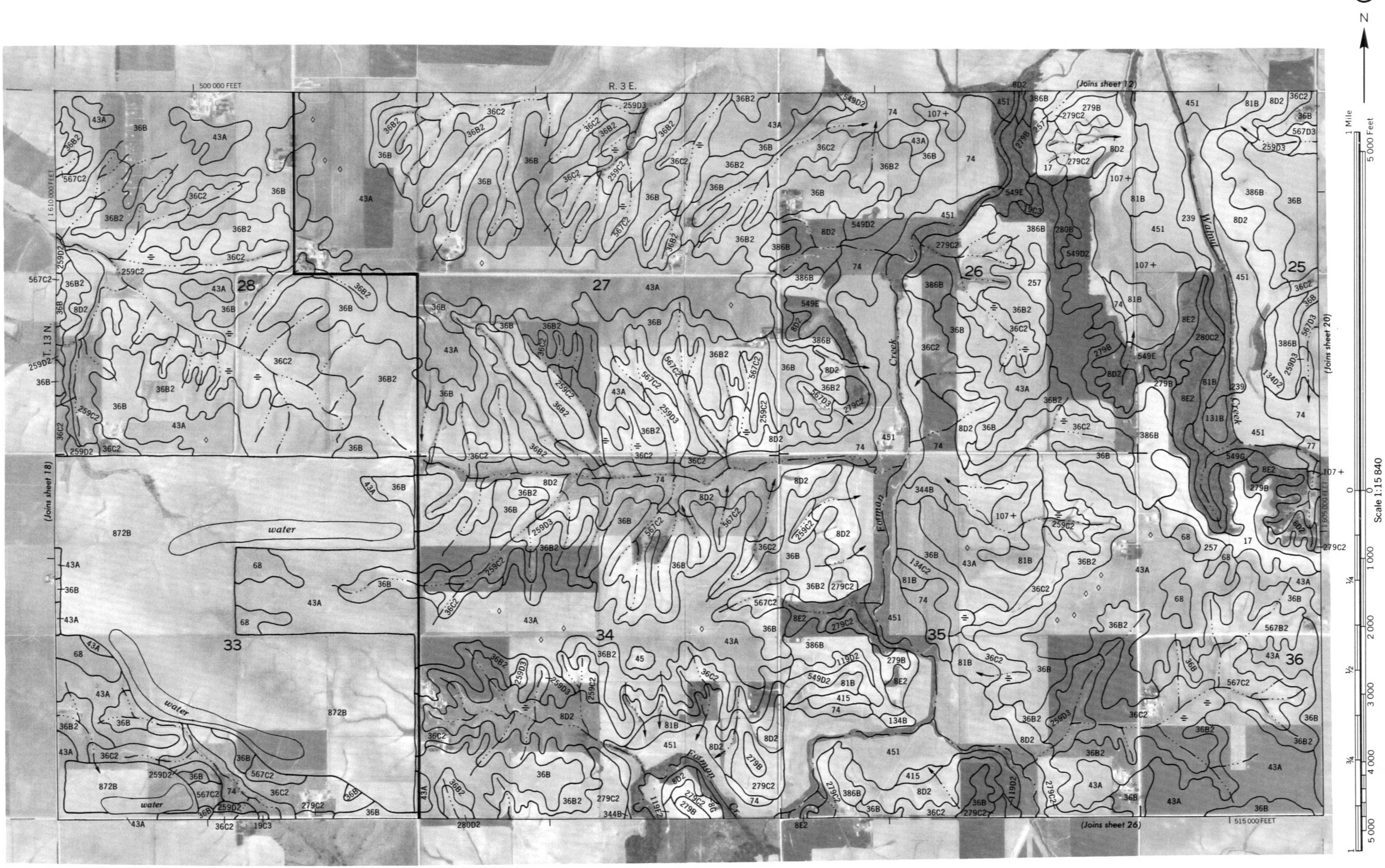
1 Mile
5 000 Feet

Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

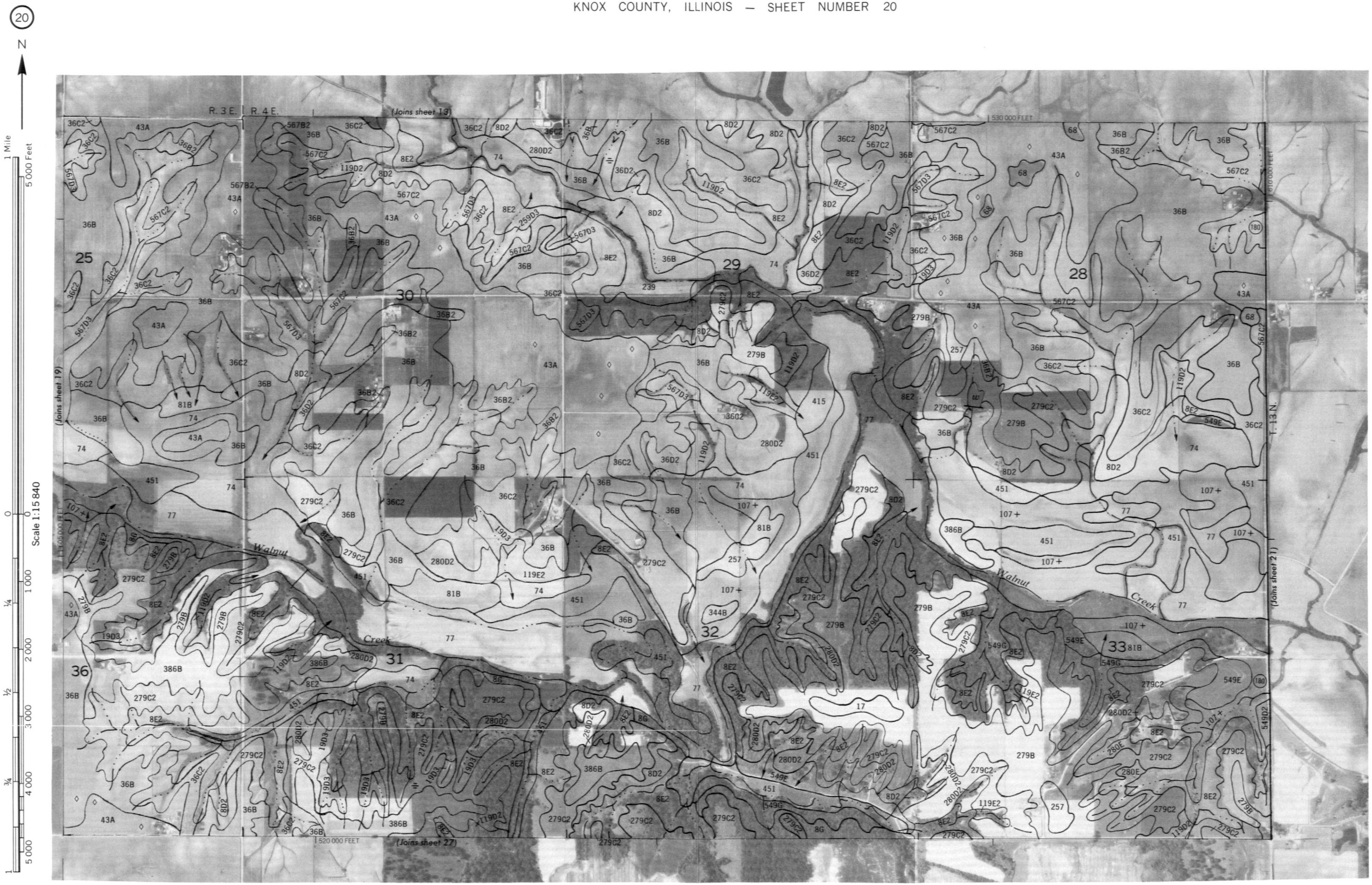
KNOX COUNTY, ILLINOIS NO. 18

19



KNOX COUNTY, ILLINOIS NO. 19

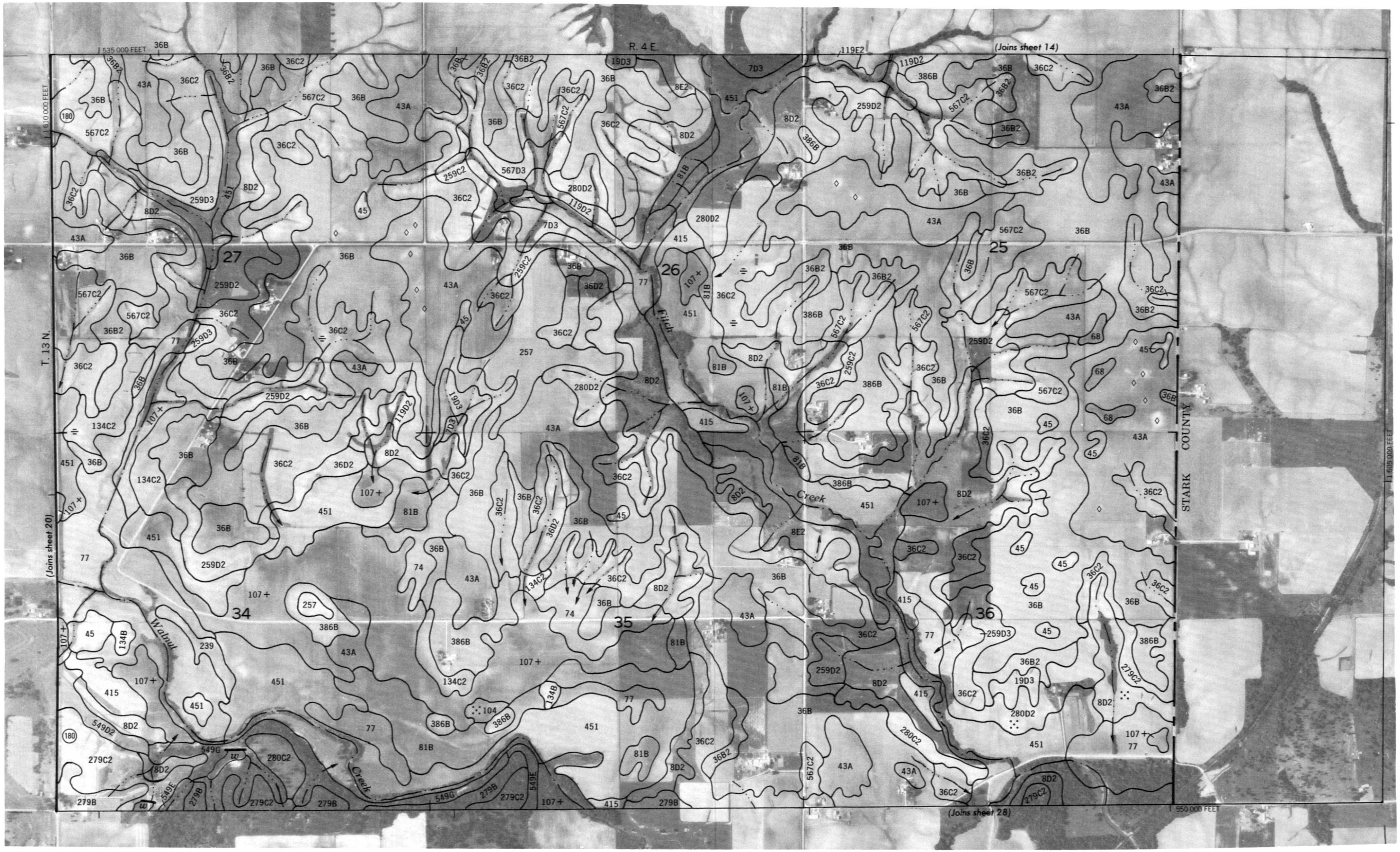
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

21

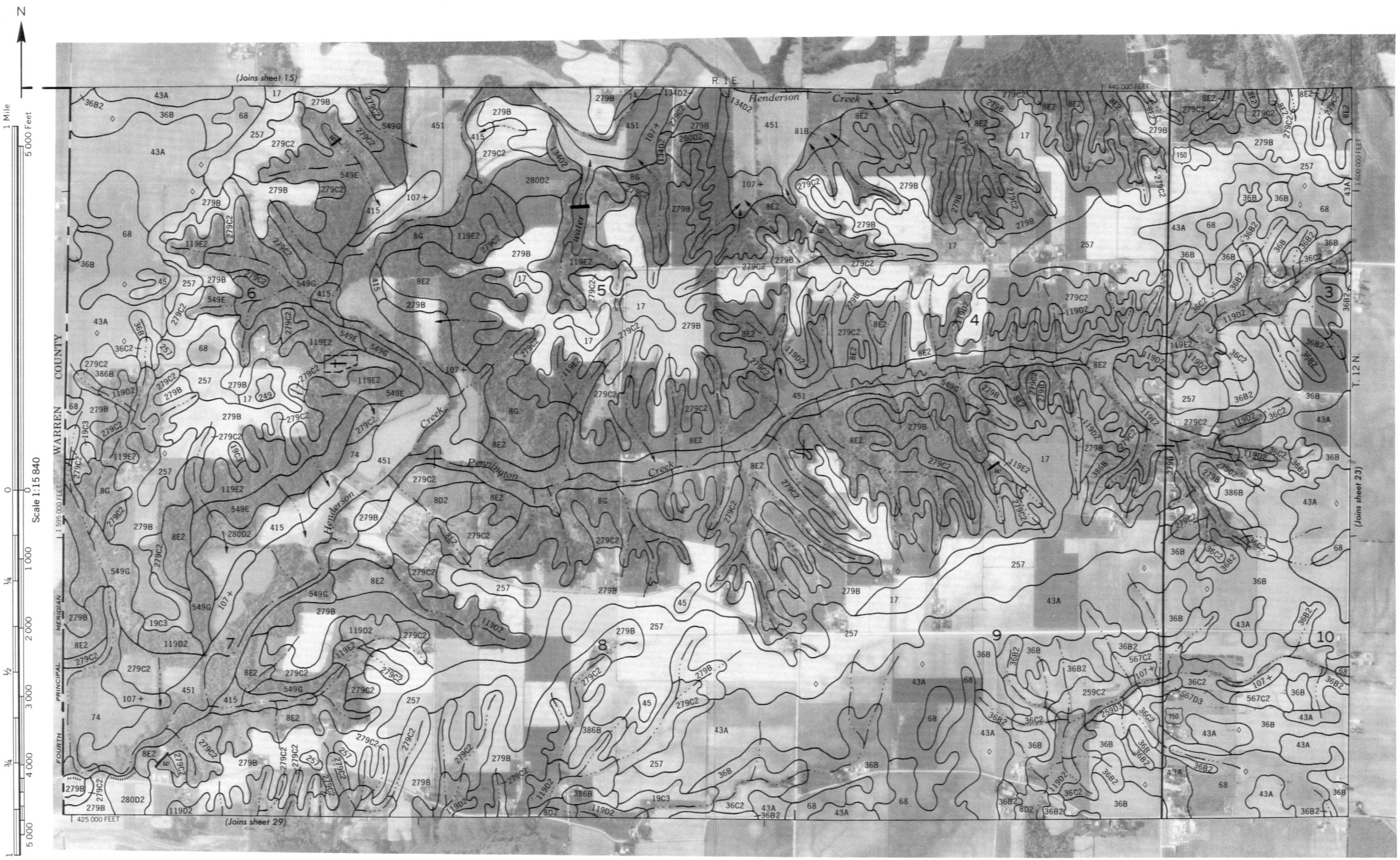
N



1 Mile
5 000 Feet
Scale 1:15 840

KNOX COUNTY, ILLINOIS NO. 21

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000

KNOX COUNTY, ILLINOIS NO. 23

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS — SHEET NUMBER 24

N

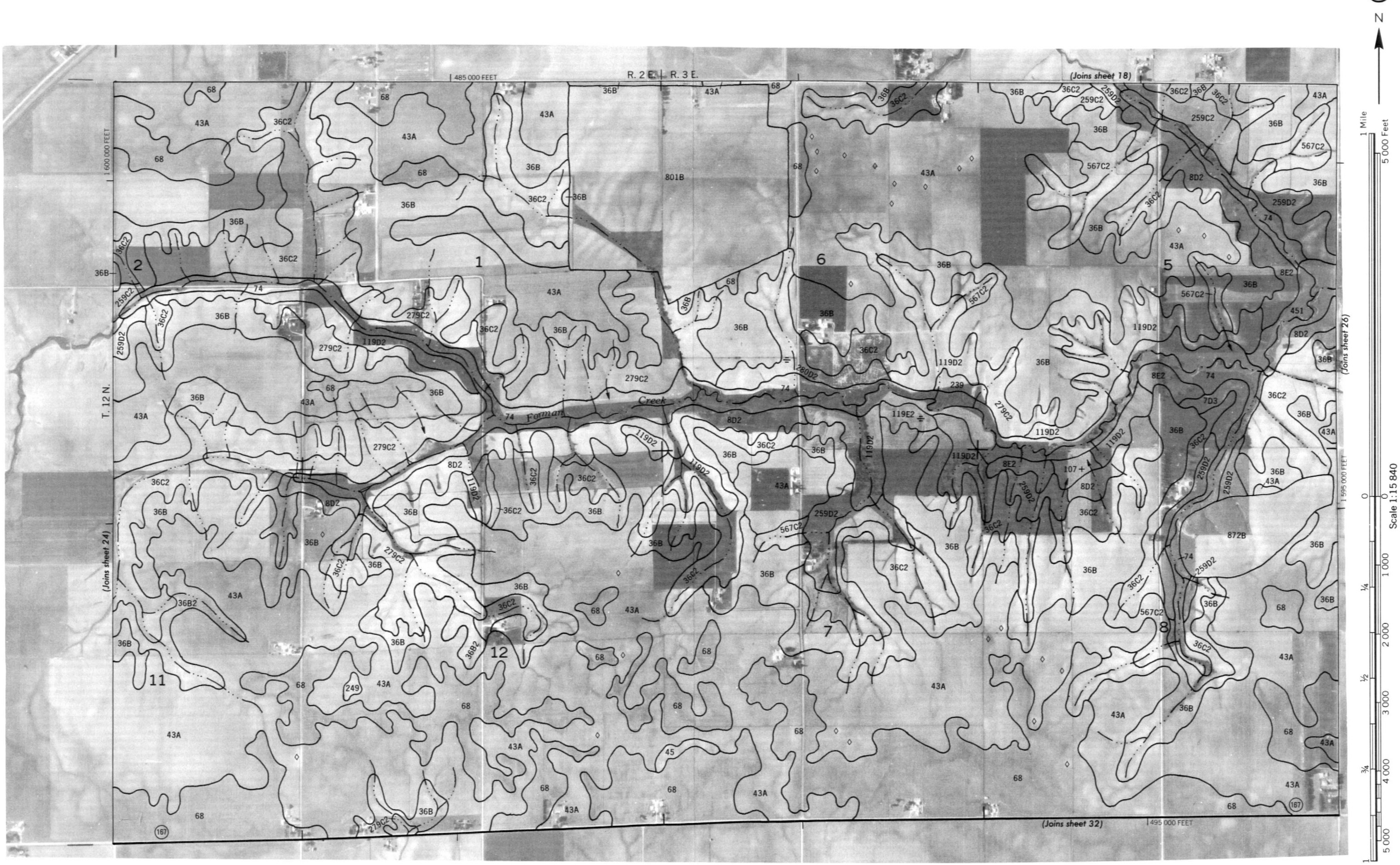
Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 24



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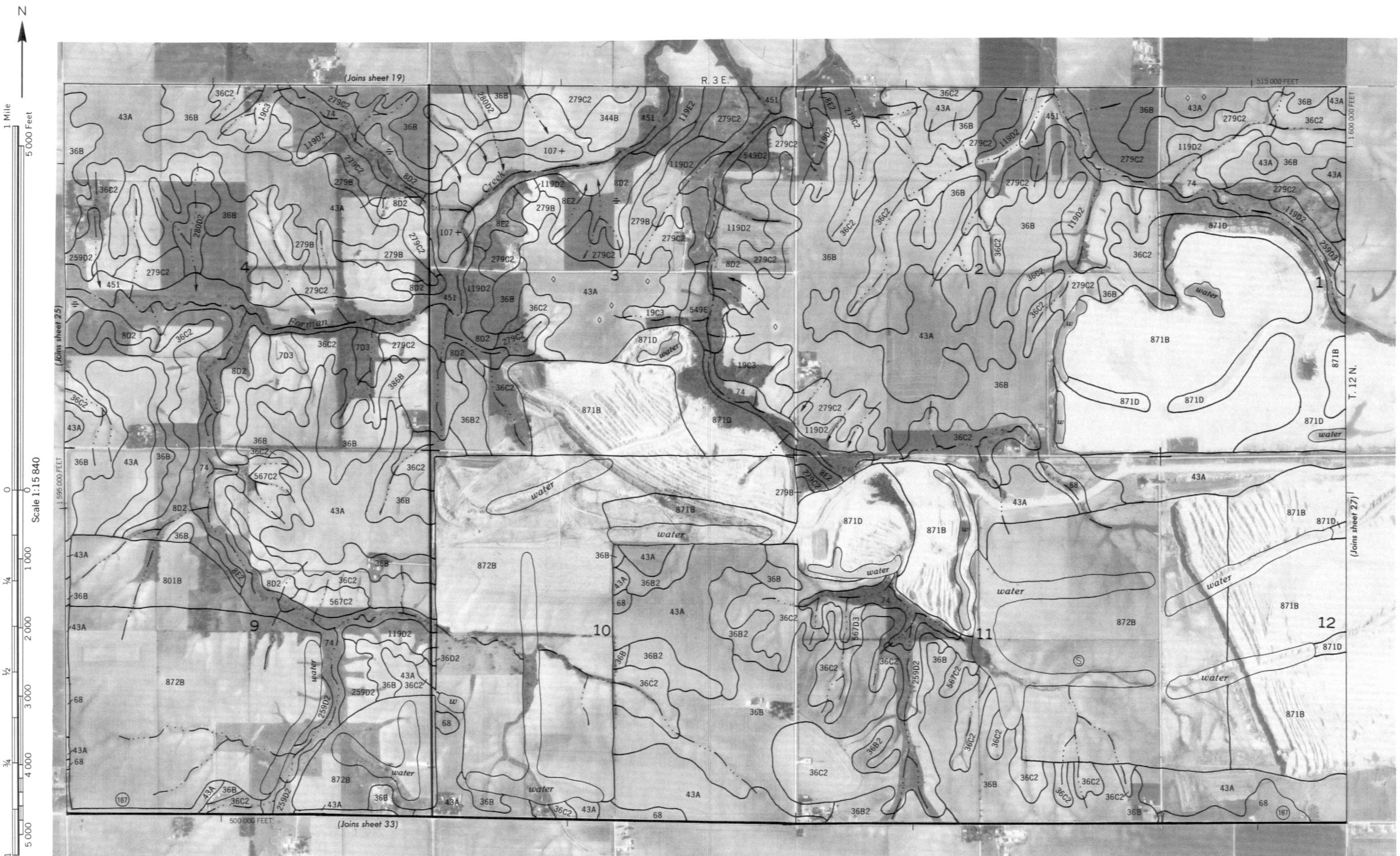
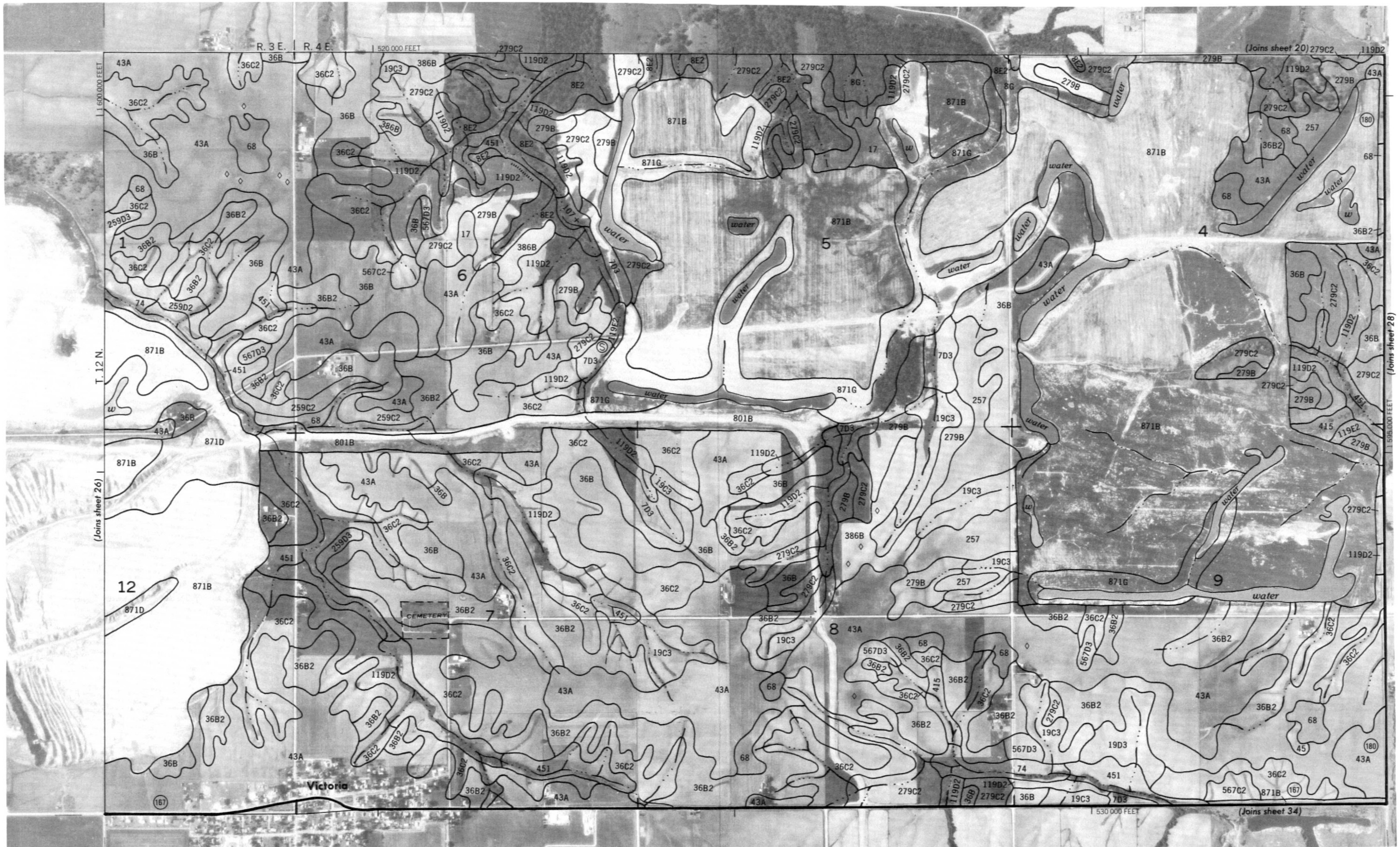


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

27

N



Scale 1:15 840

1 Mile

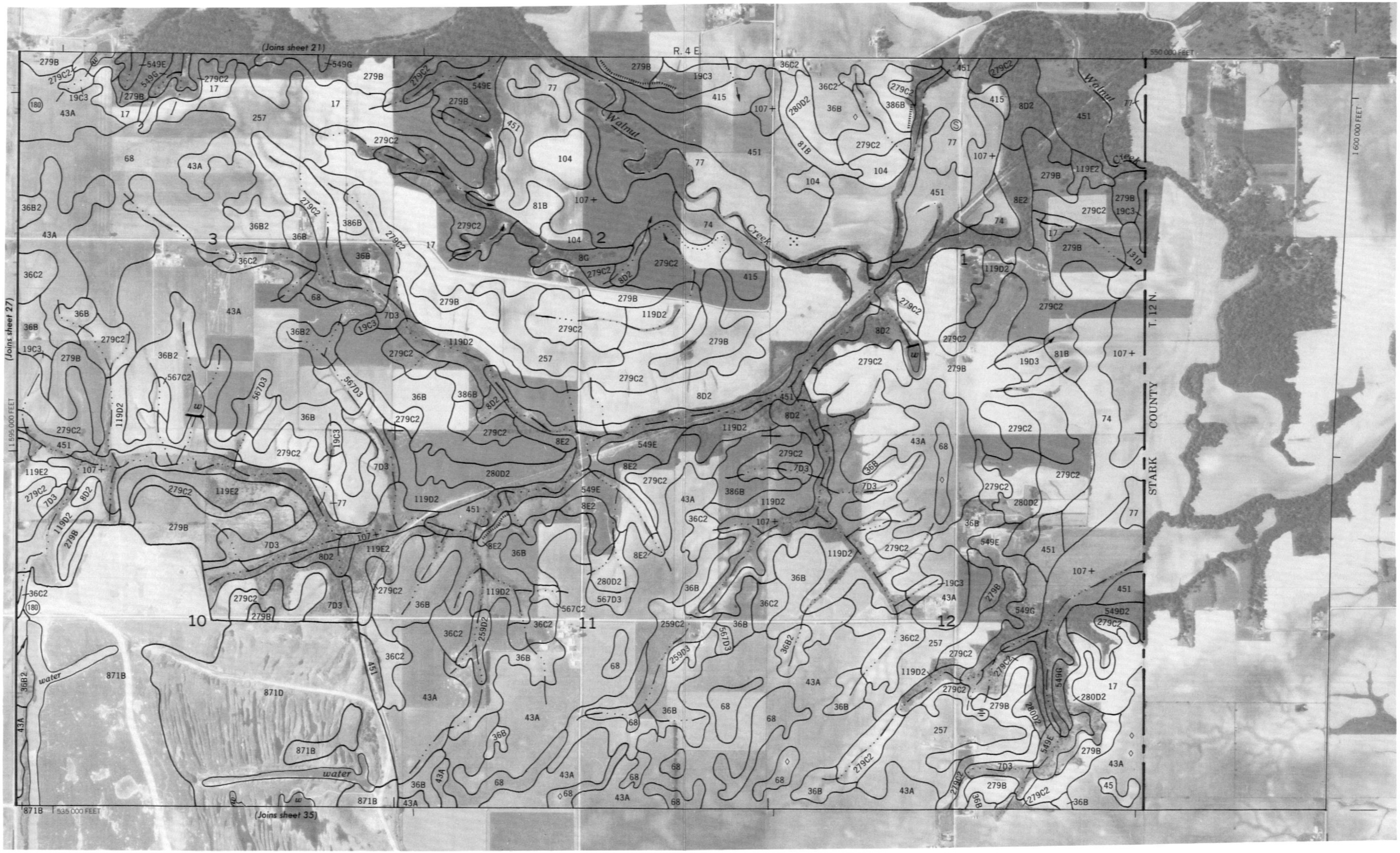
5 000 Feet

KNOX COUNTY, ILLINOIS NO. 27

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

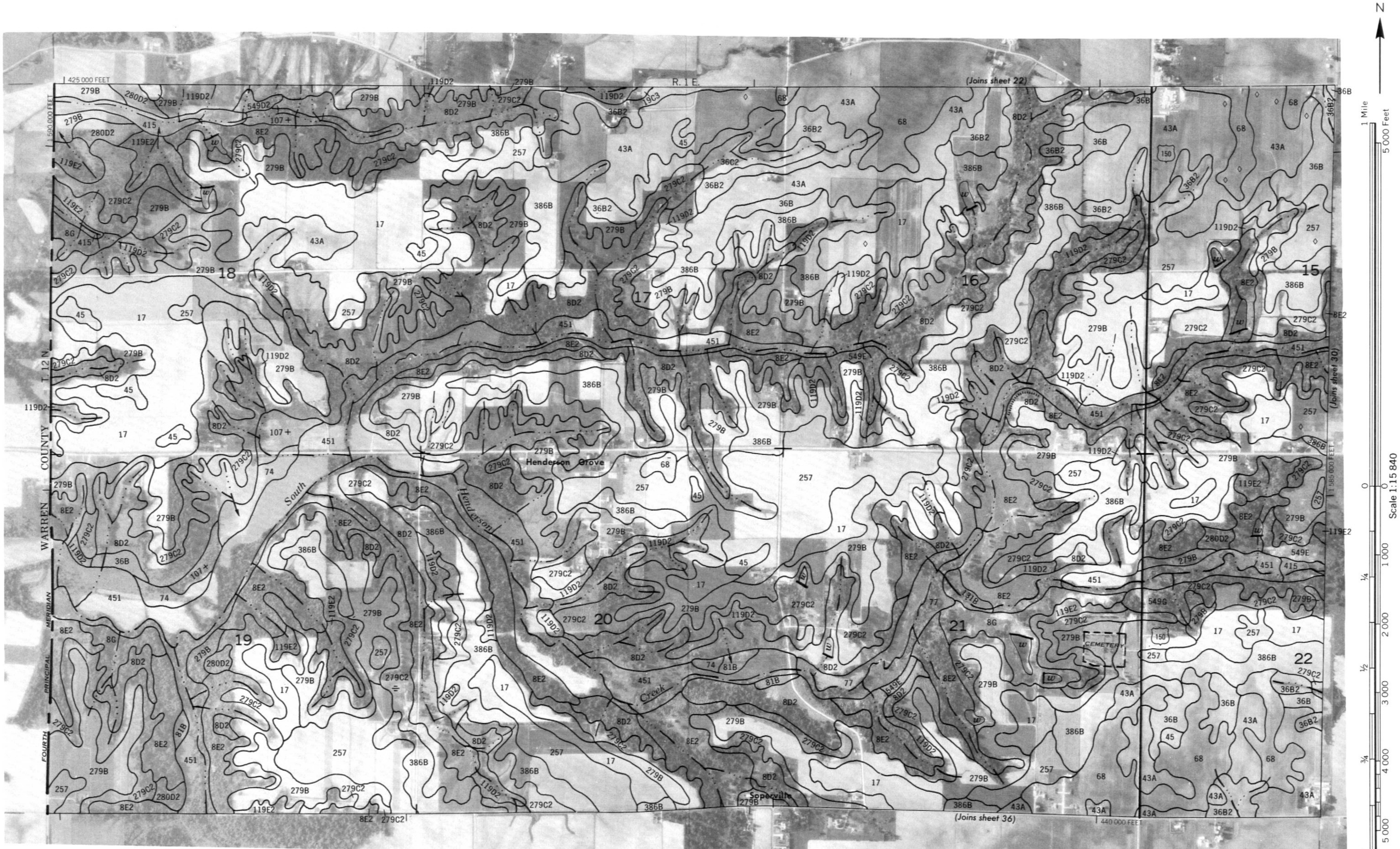
28

N



1 Mile
5 000 Feet
Scale 1:15 840
0 1 000 2 000 3 000 4 000 5 000
¼ ½ ¾ 1

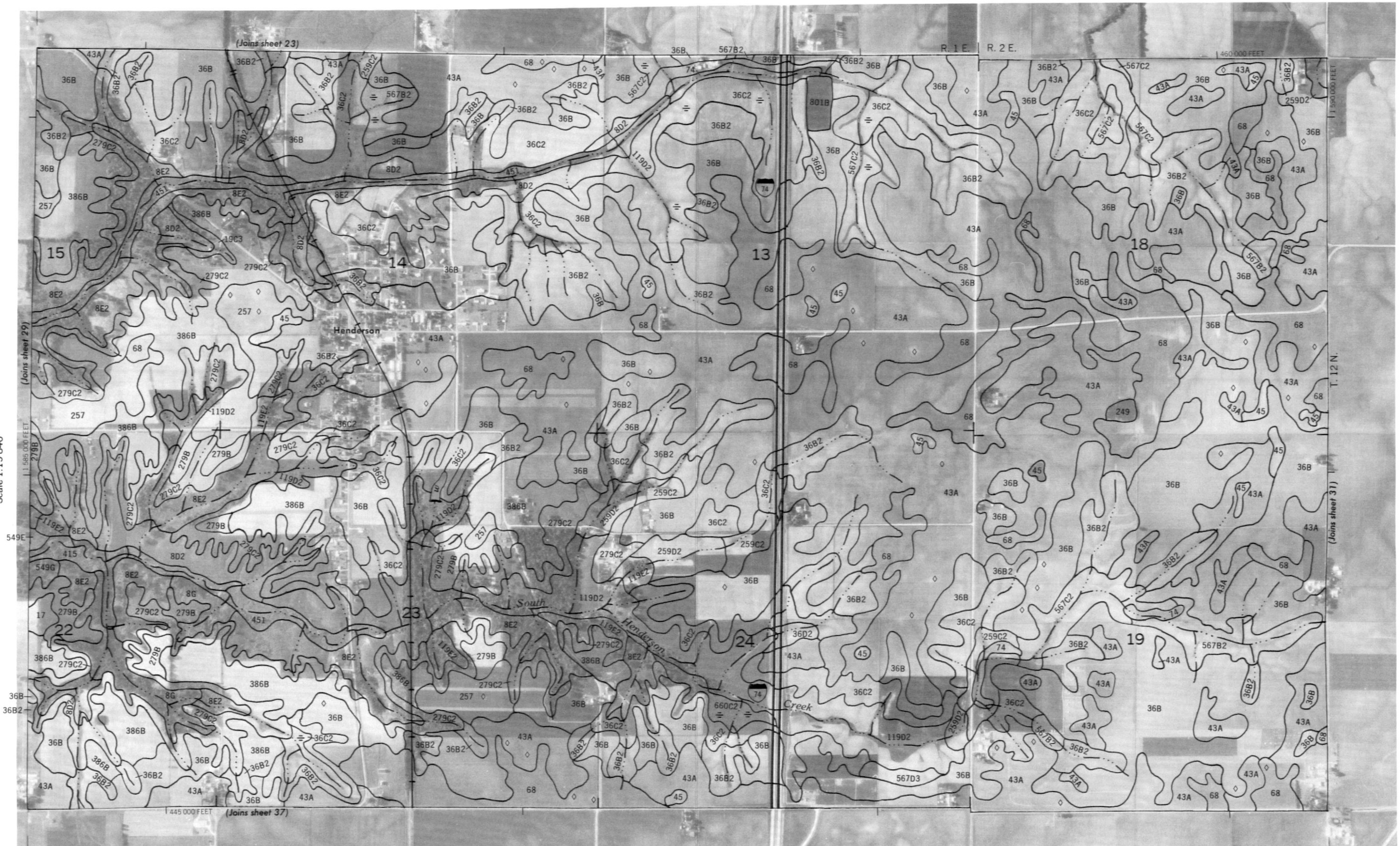
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



KNOX COUNTY, ILLINOIS NO. 29

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

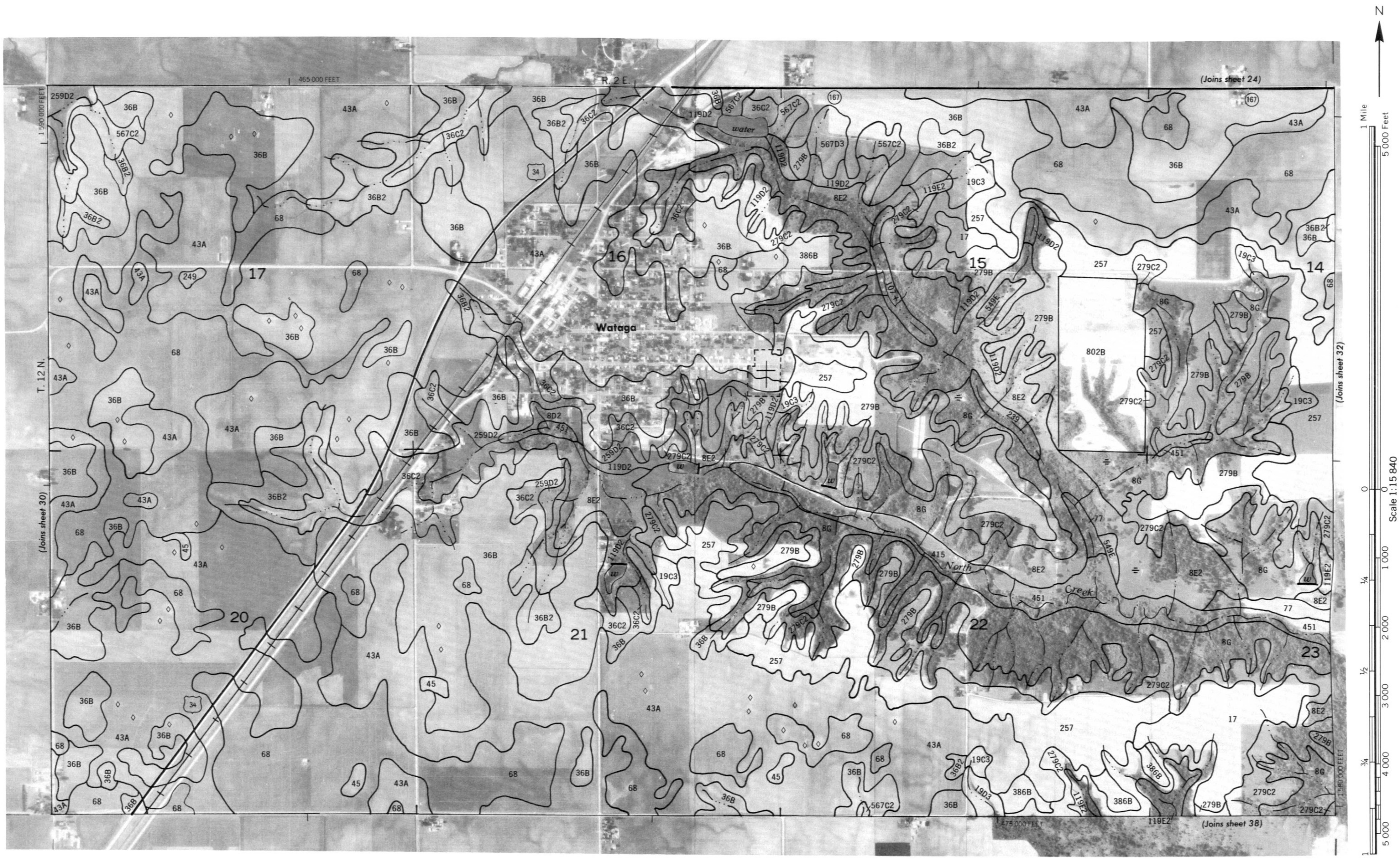
N



Scale 1:15 840

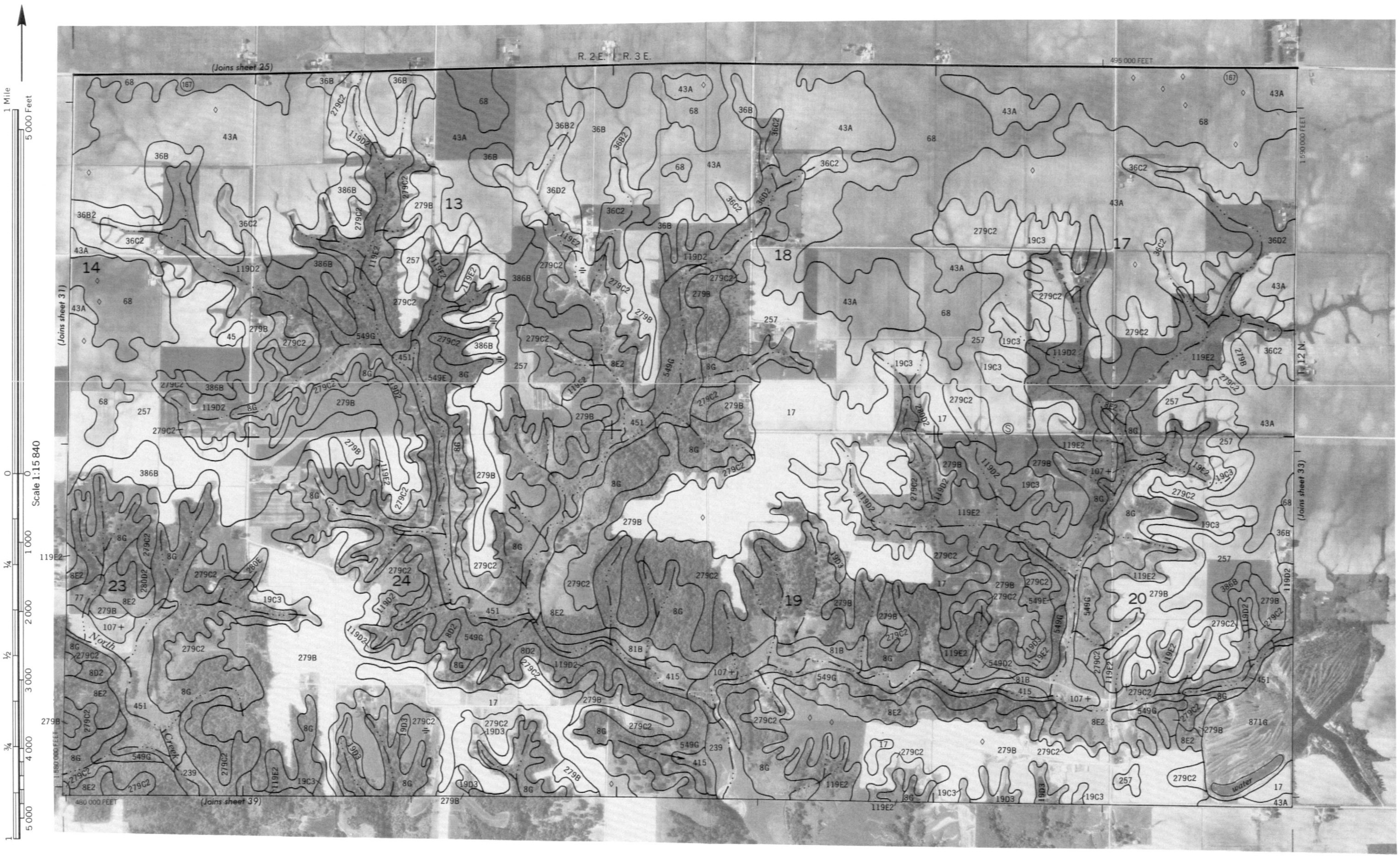
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



KNOX COUNTY, ILLINOIS NO. 31

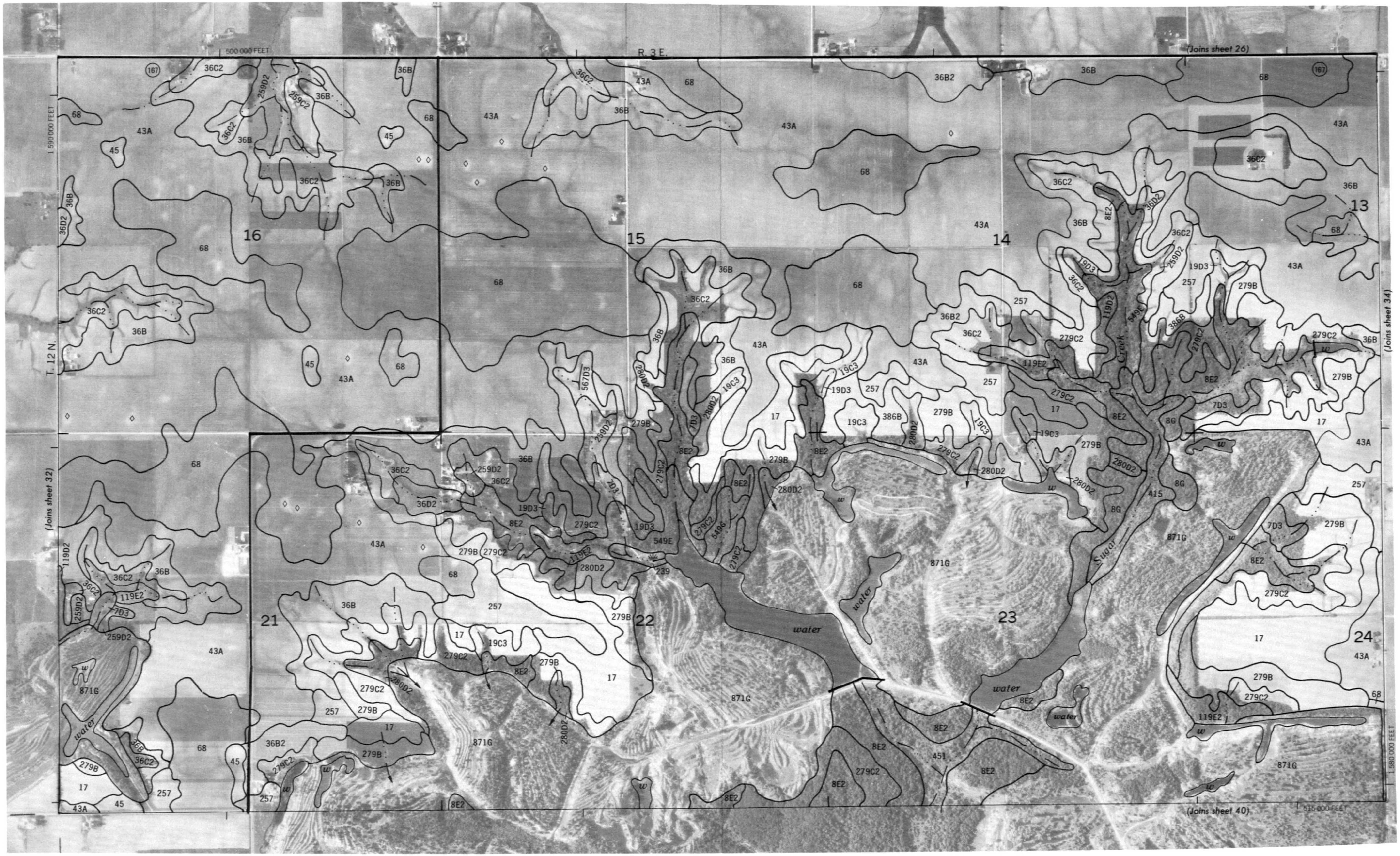
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 33

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

Scale 1:15 840

1 Mile

5 000 Feet

0

1/4

1/2

3/4

1

0

1 000

2 000

3 000

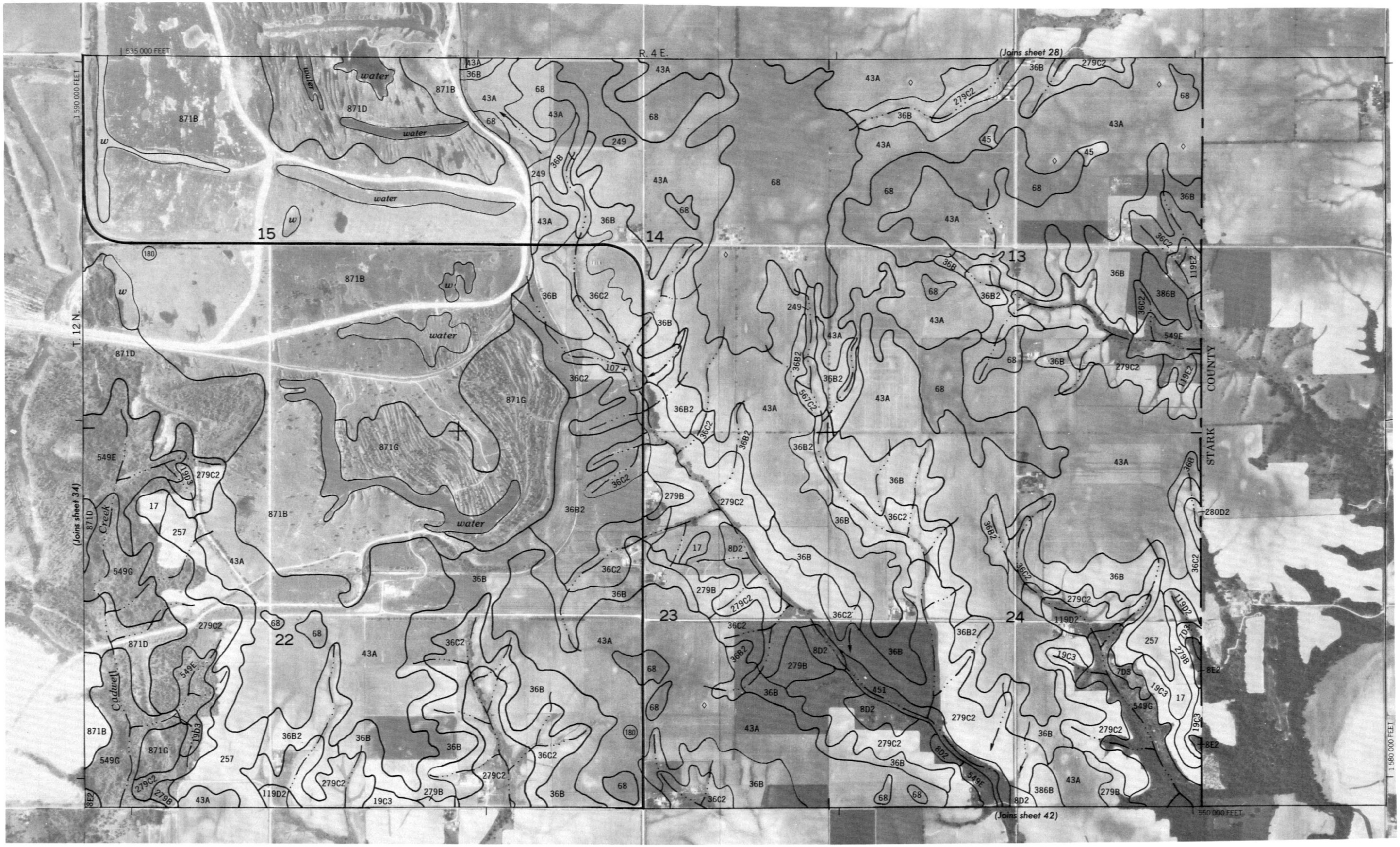
4 000

5 000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 35

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

Scale 1:15 840

1 Mile

5 000 Feet

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

N

1 Mile
5 000 Feet
Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 36

37

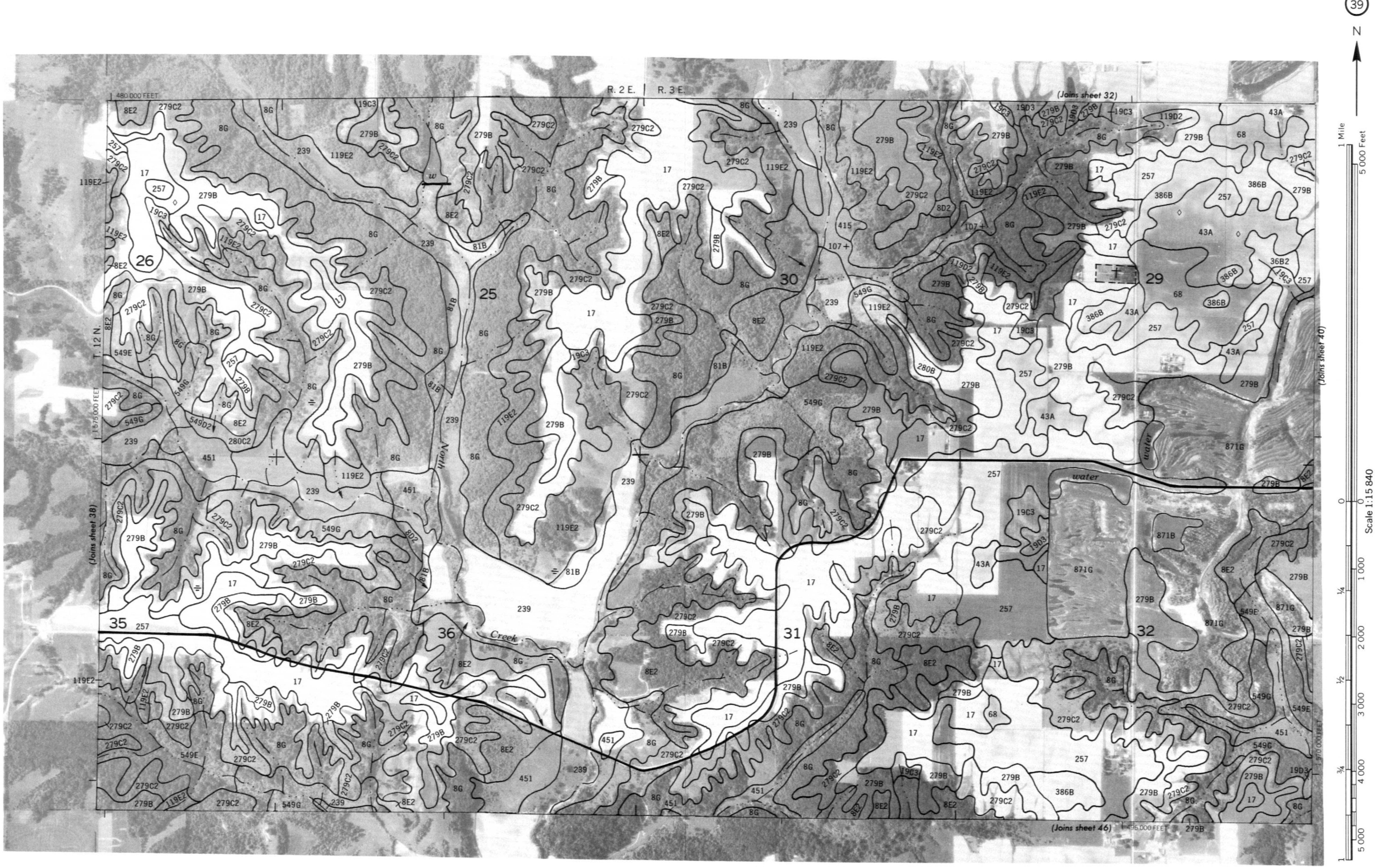
KNOX COUNTY, ILLINOIS NO. 37

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS — SHEET NUMBER 38

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 38



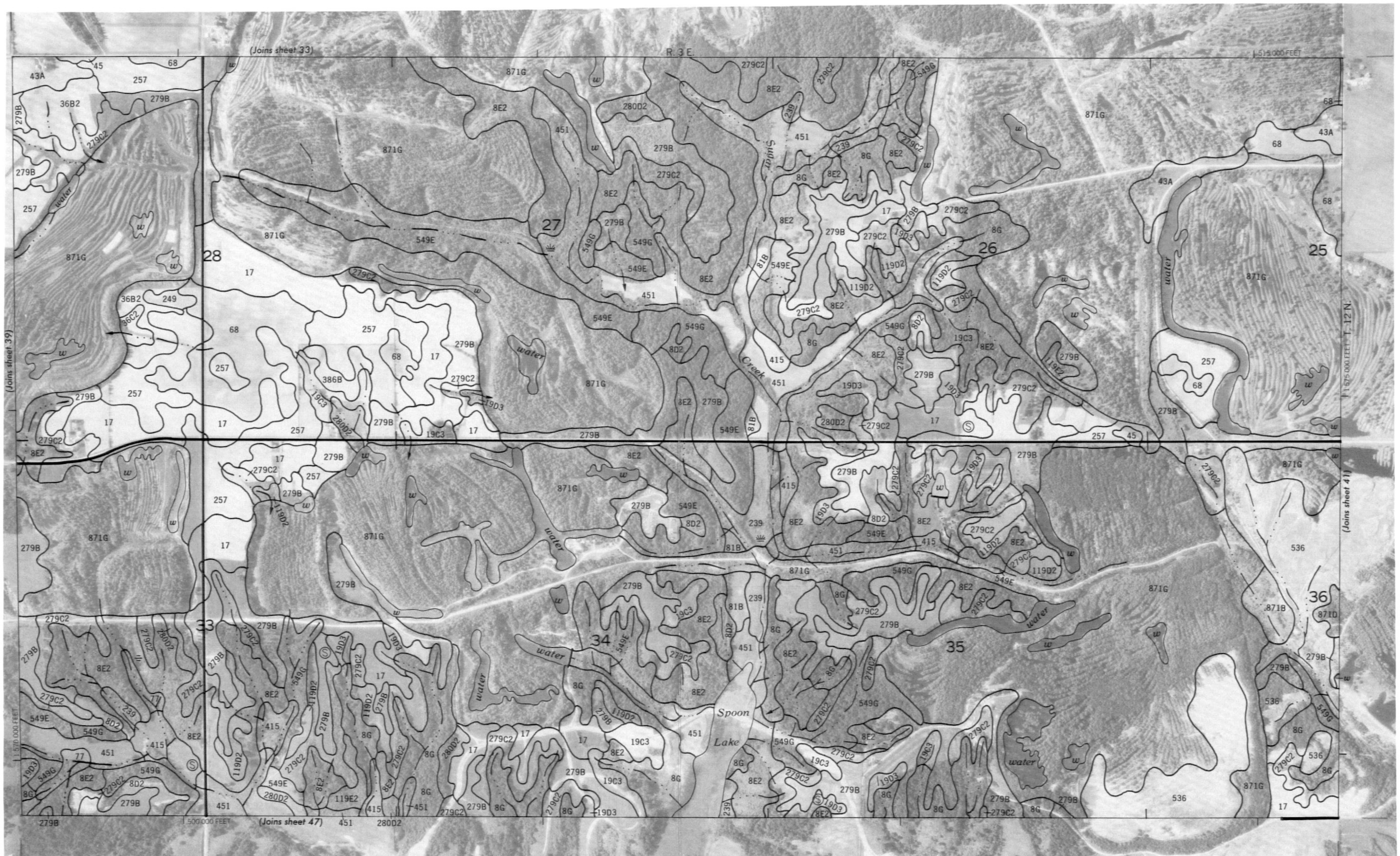
KNOX COUNTY, ILLINOIS NO. 39

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

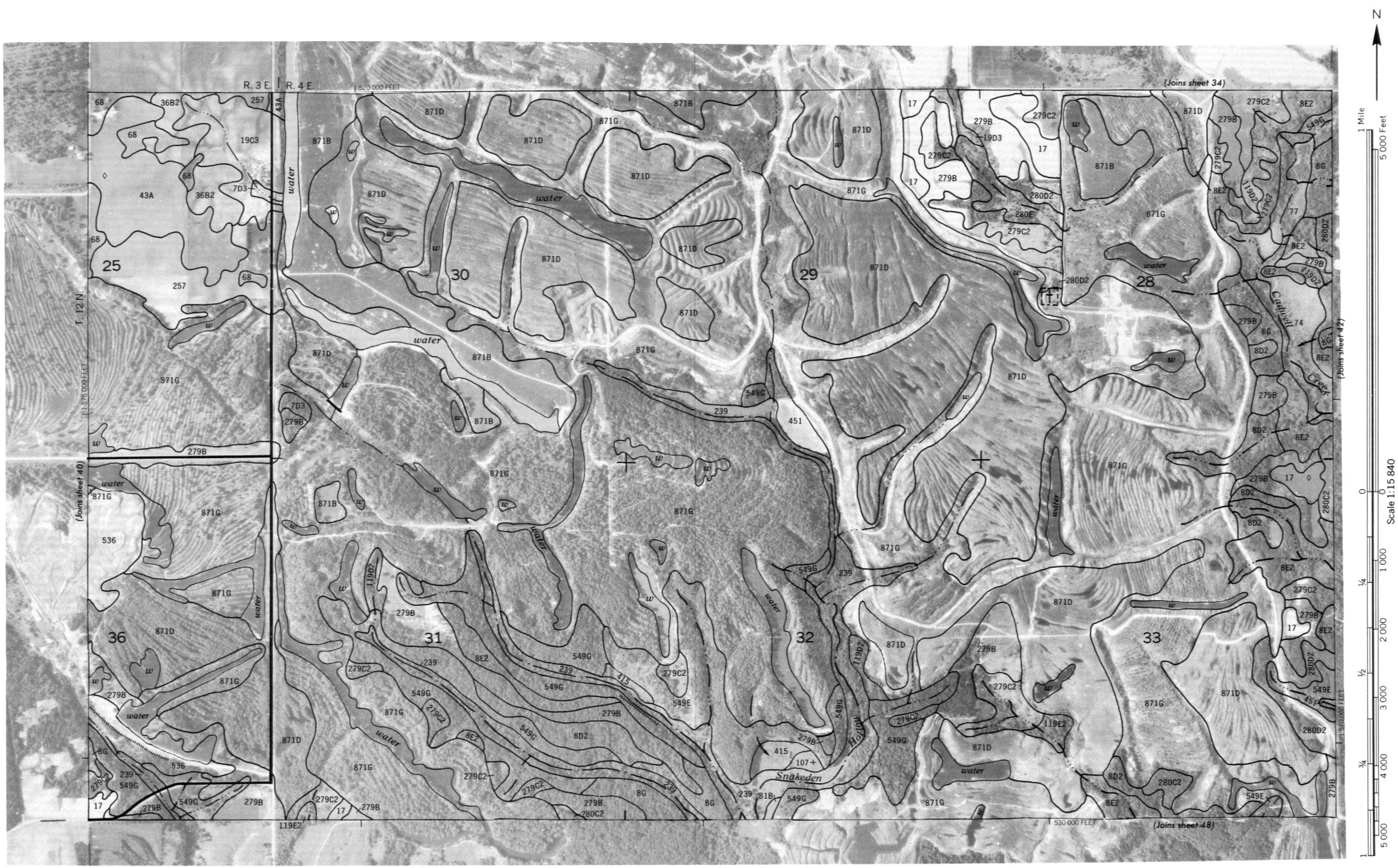
KNOX COUNTY, ILLINOIS — SHEET NUMBER 40

N

1 Mile
5 000 Feet
Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



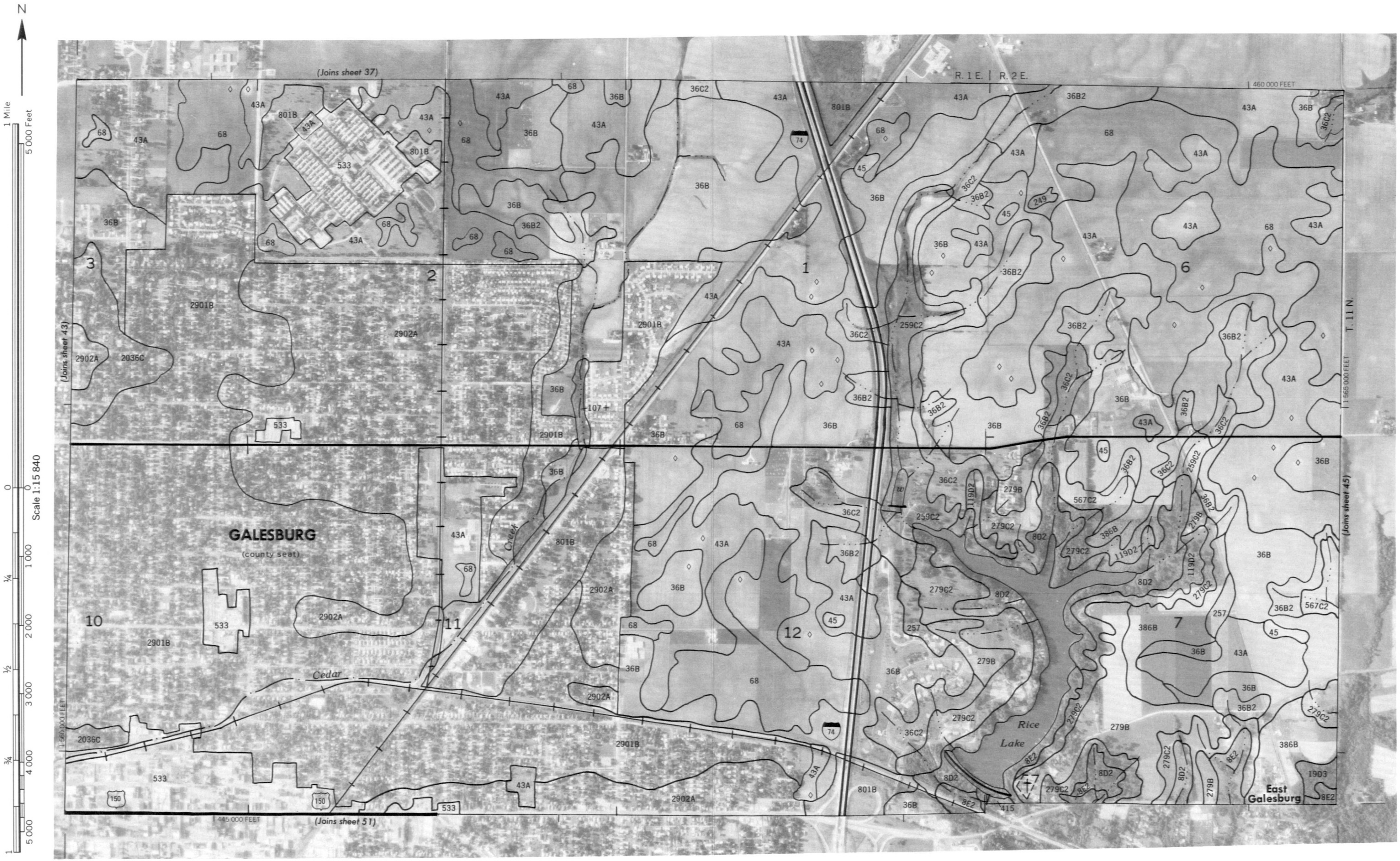
KNOX COUNTY, ILLINOIS NO. 41

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

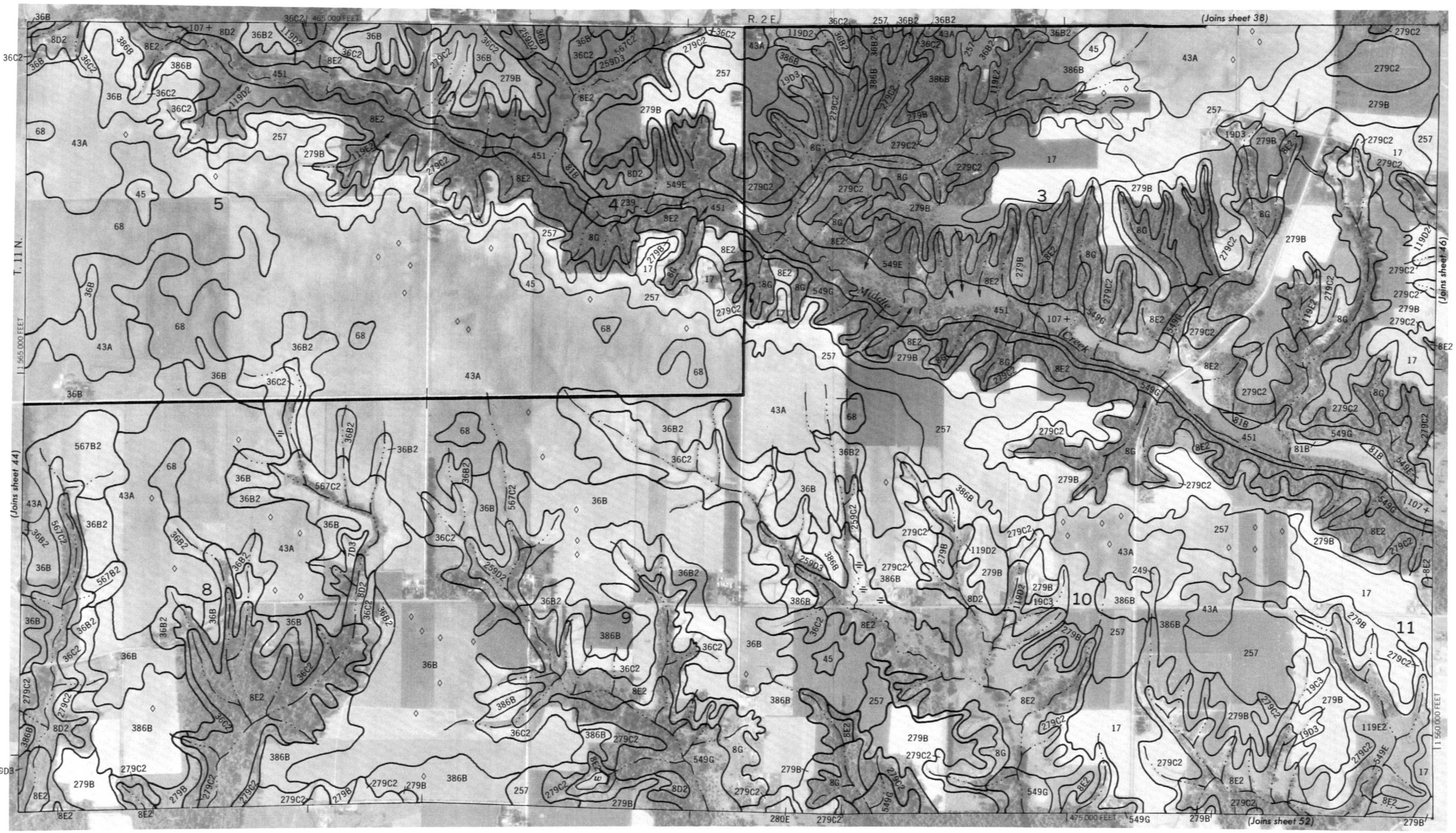
KNOX COUNTY, ILLINOIS NO. 43

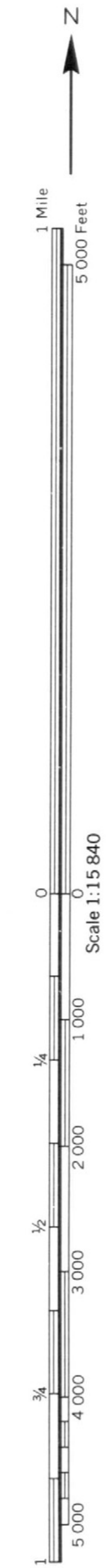
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



KNOX COUNTY, ILLINOIS NO. 44

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.





KNOX COUNTY, ILLINOIS NO. 45

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

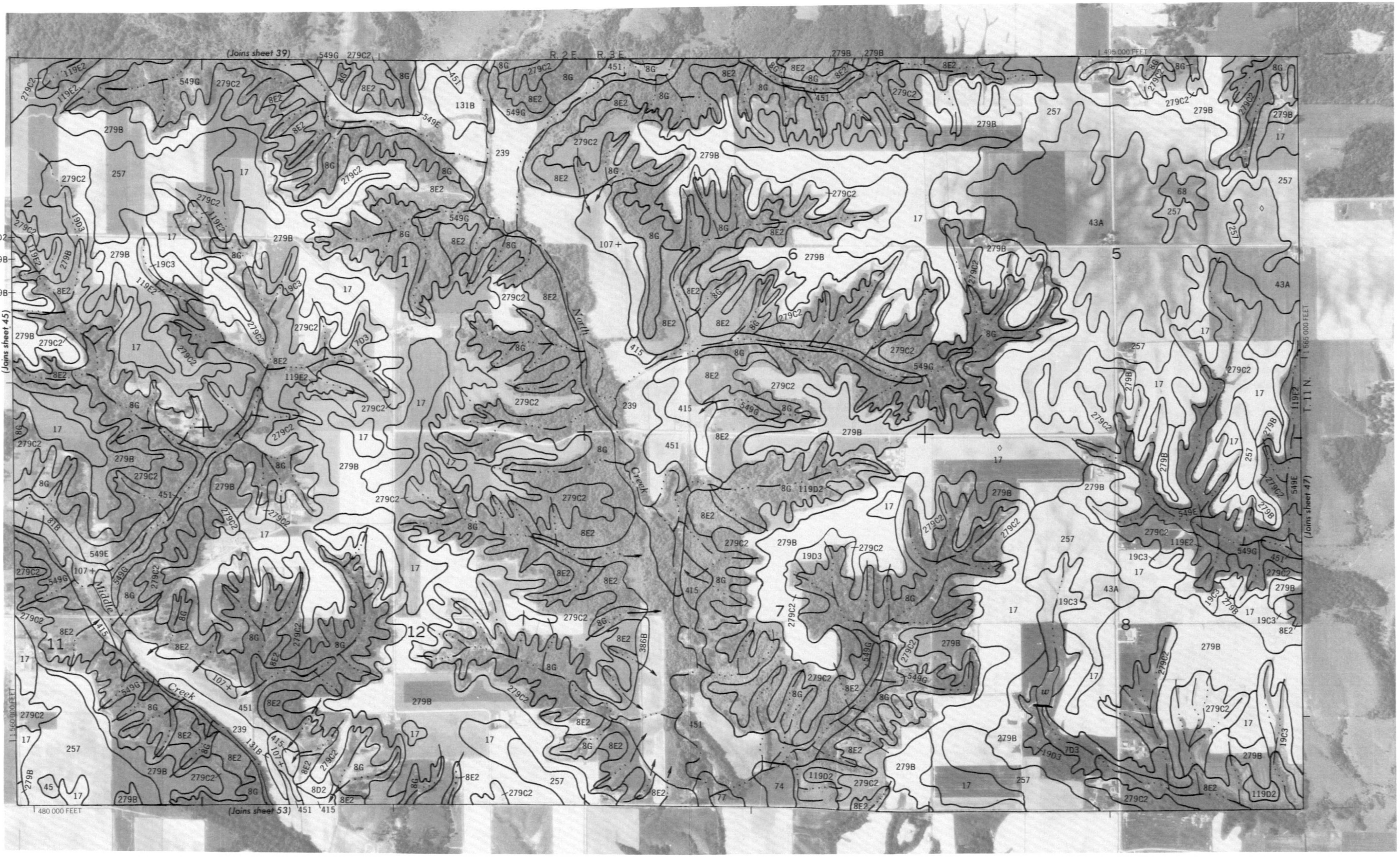
46

N

1 Mile

5 000 Feet

Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

KNOX COUNTY, ILLINOIS NO. 47

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

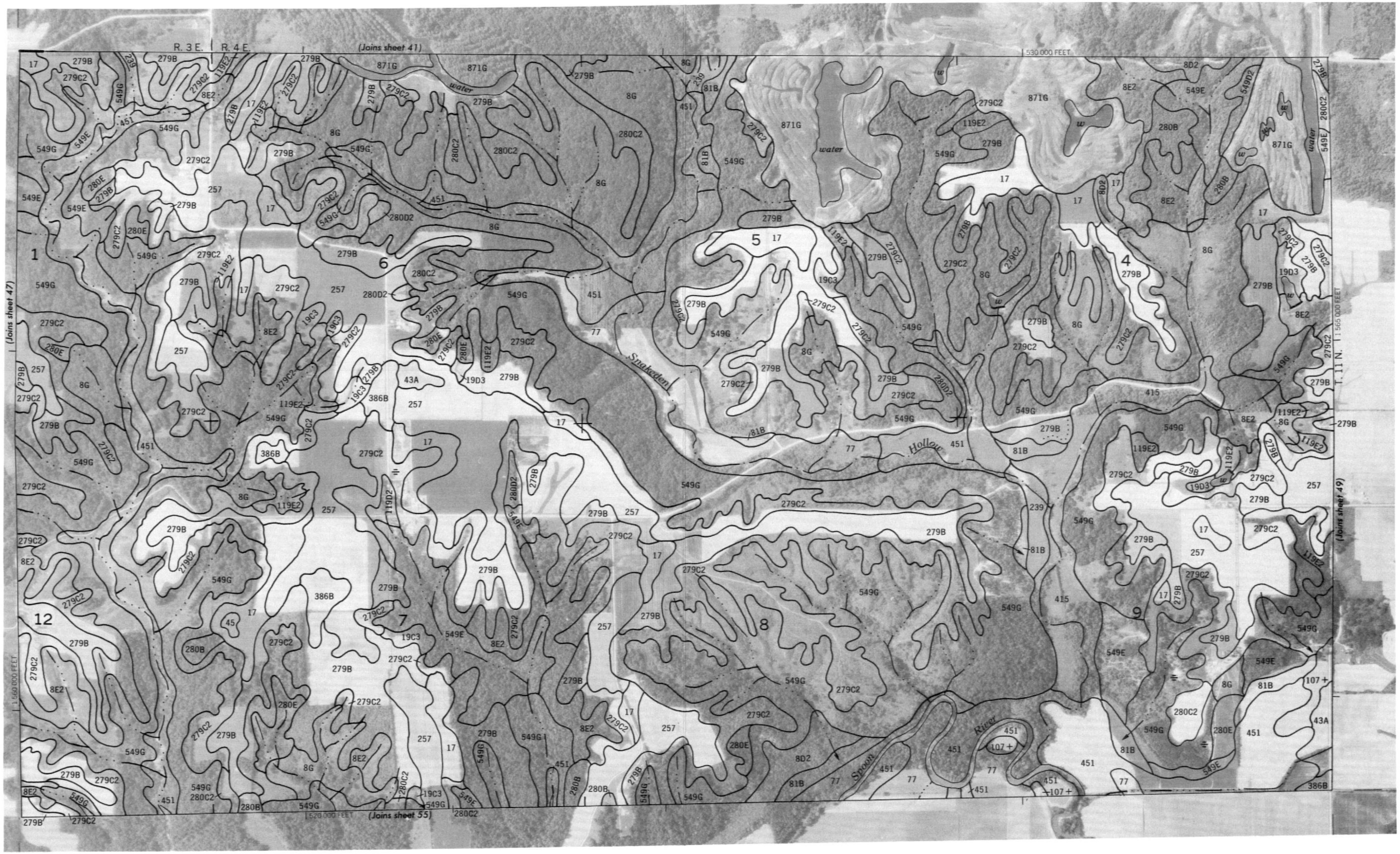
1 Mile

5 000 Feet

Scale 1:15 840

0 1 000 2 000 3 000 4 000 5 000

0 ¼ ½ ¾ 1

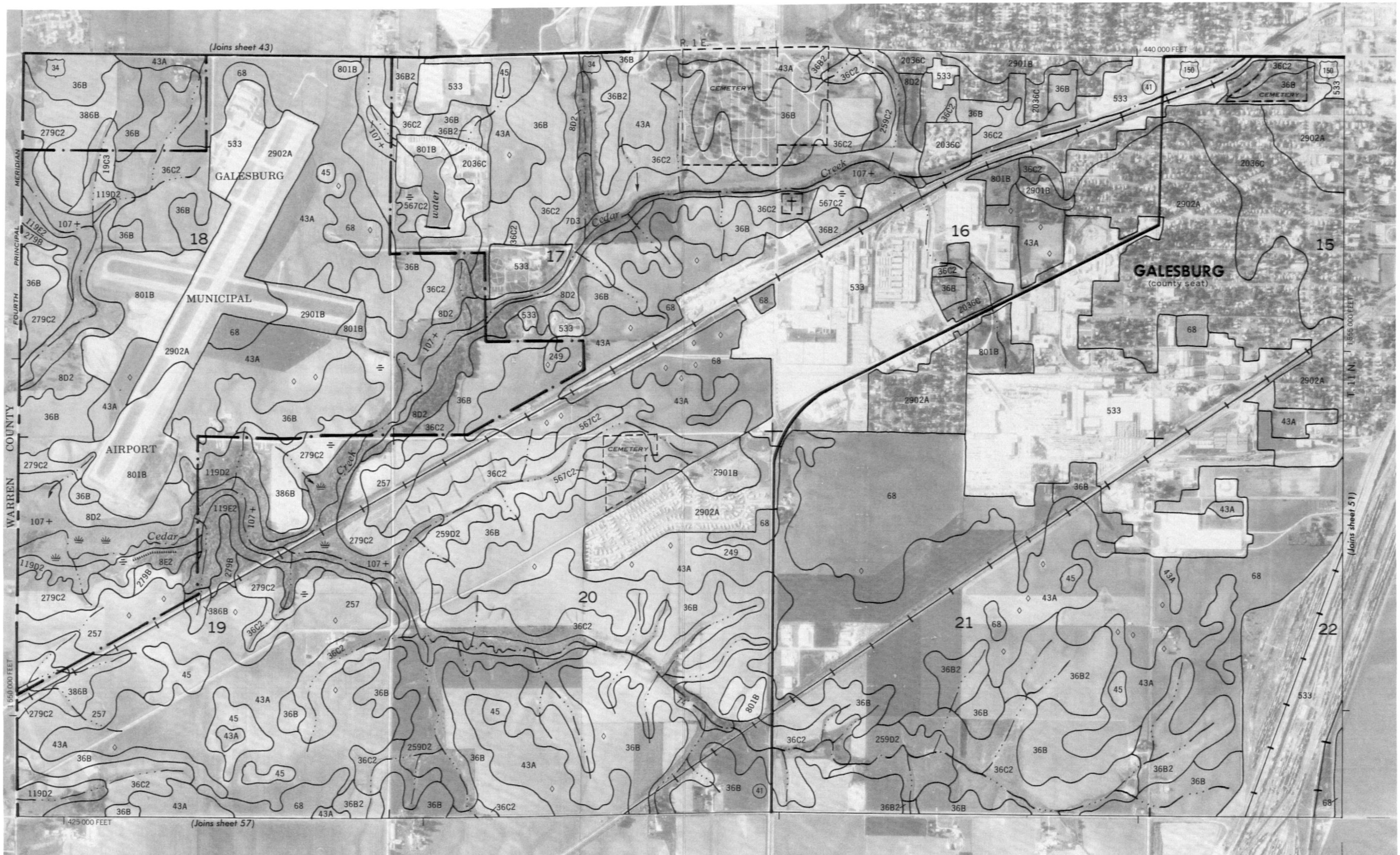


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 49

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



Scale 1:15 840

1 Mile

5 000 Feet

0 1 000 2 000 3 000 4 000 5 000

0 ¼ ½ ¾

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale 1:15 840

1 Mile

5 000 Feet

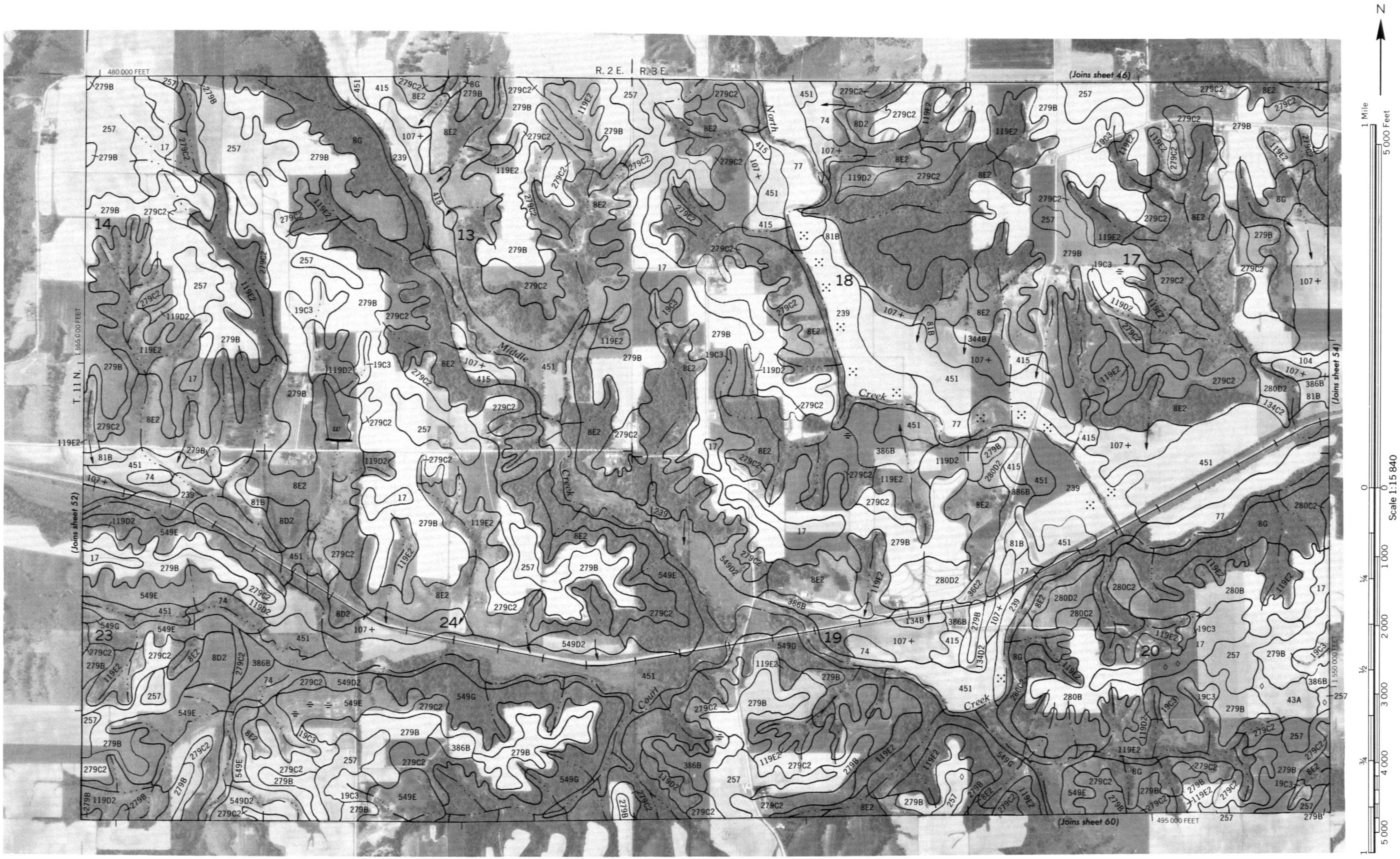
0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

KNOX COUNTY, ILLINOIS NO. 51

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



KNOX COUNTY, ILLINOIS NO. 53

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(54)

N

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 54

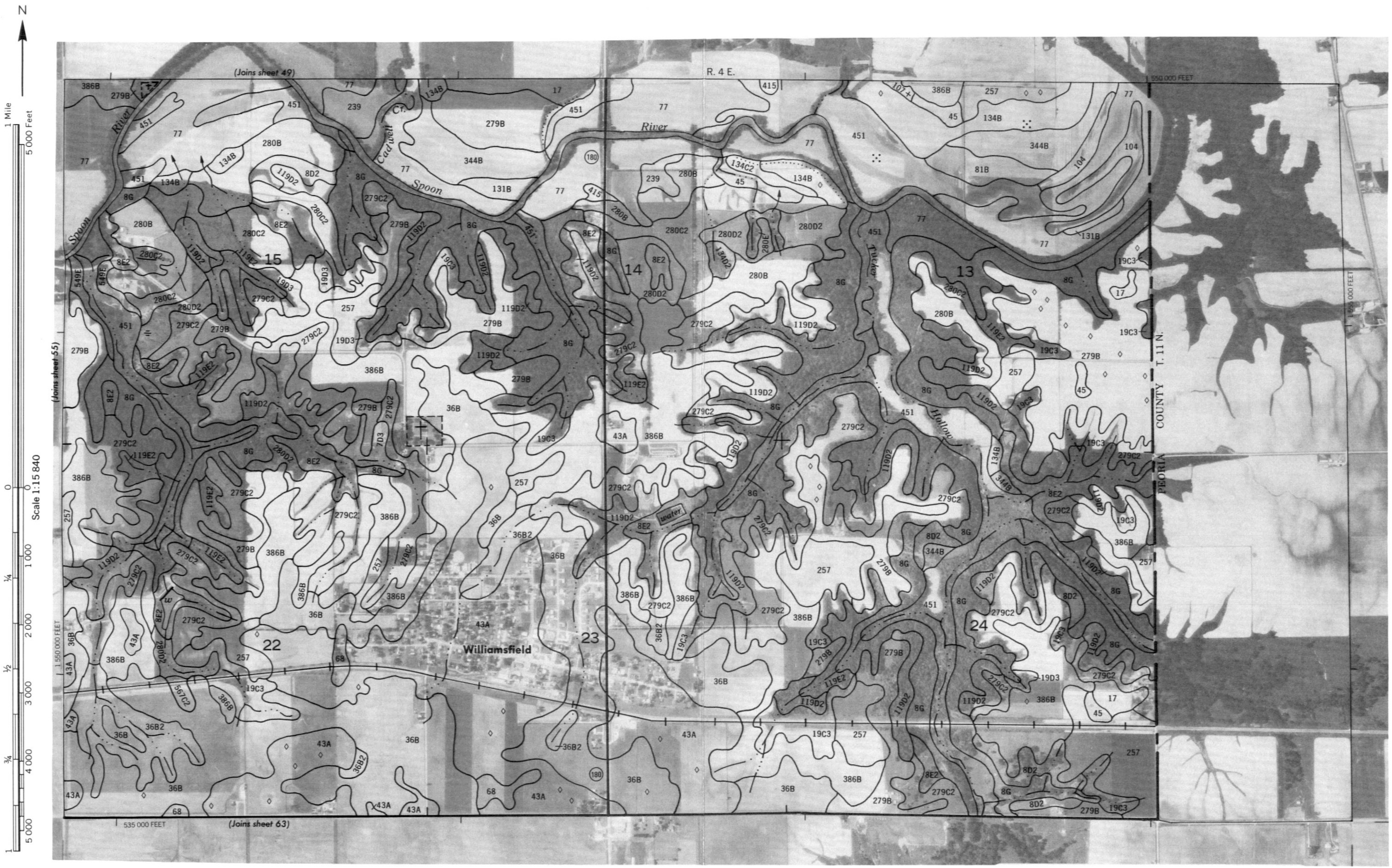
55

N

1 Mile
5 000 Feet
0
Scale 1:15 840
0
1 000
¼
2 000
½
3 000
4 000
¾
5 000

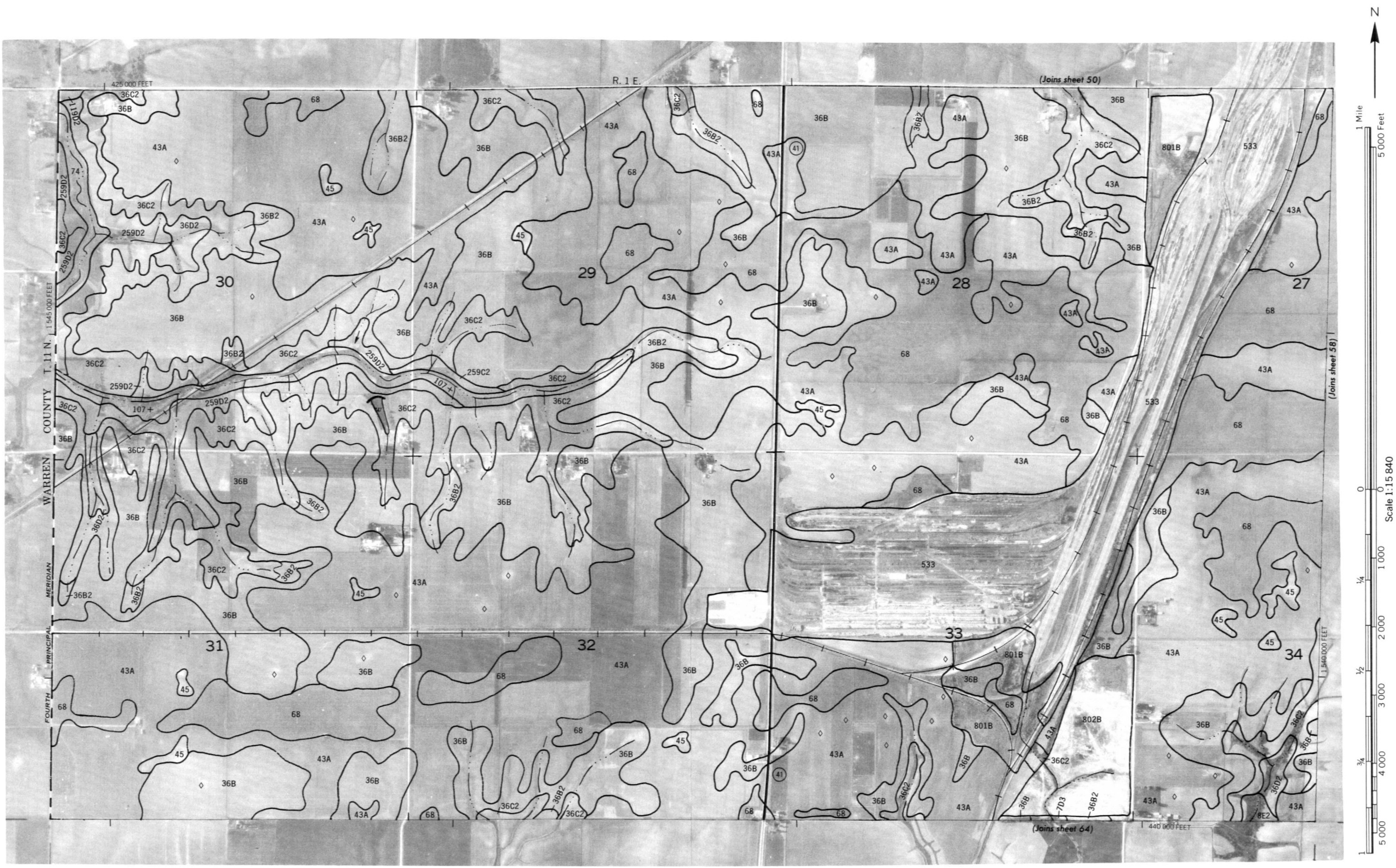
KNOX COUNTY, ILLINOIS NO. 55

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



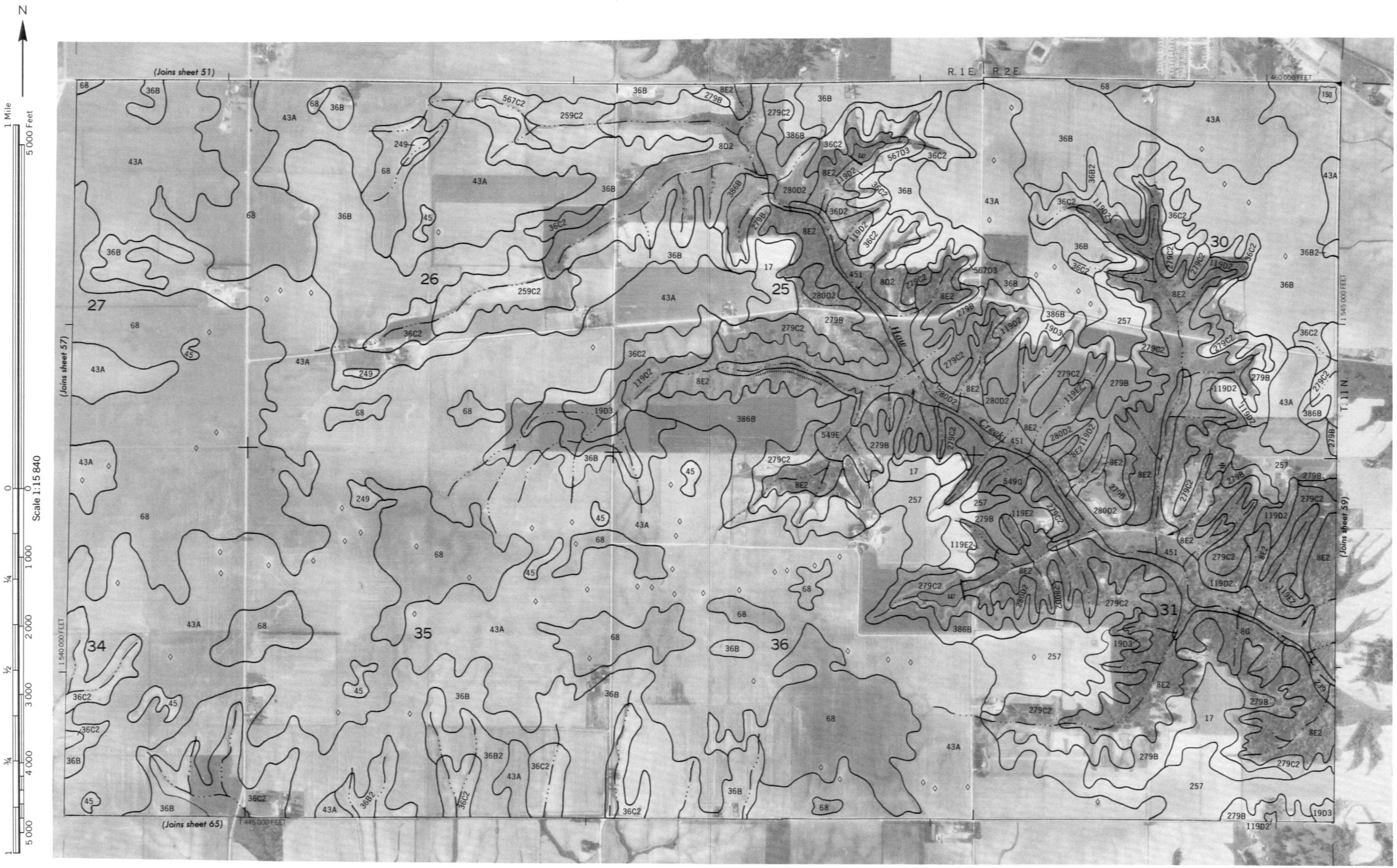
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 56



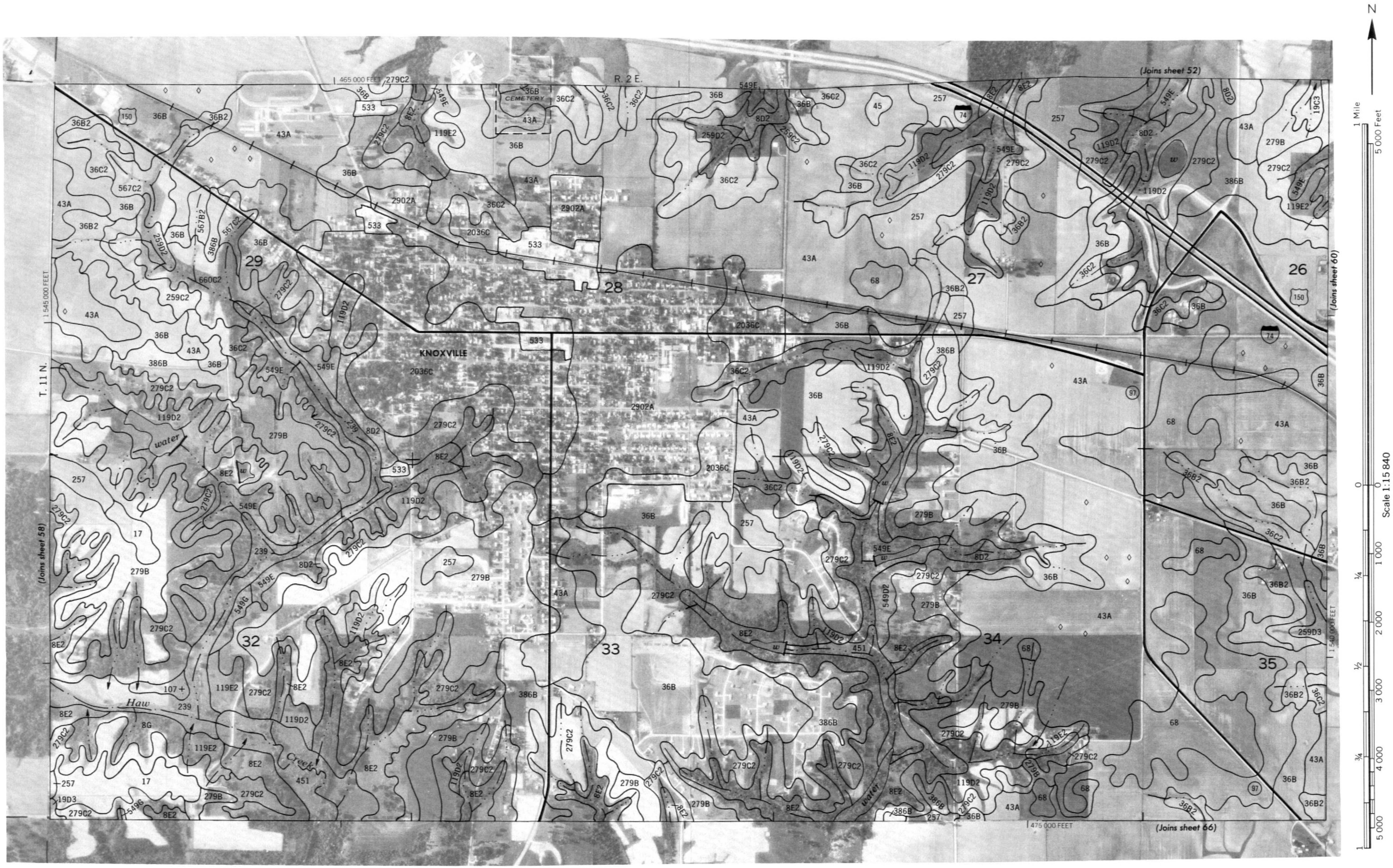
KNOX COUNTY, ILLINOIS NO. 57

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



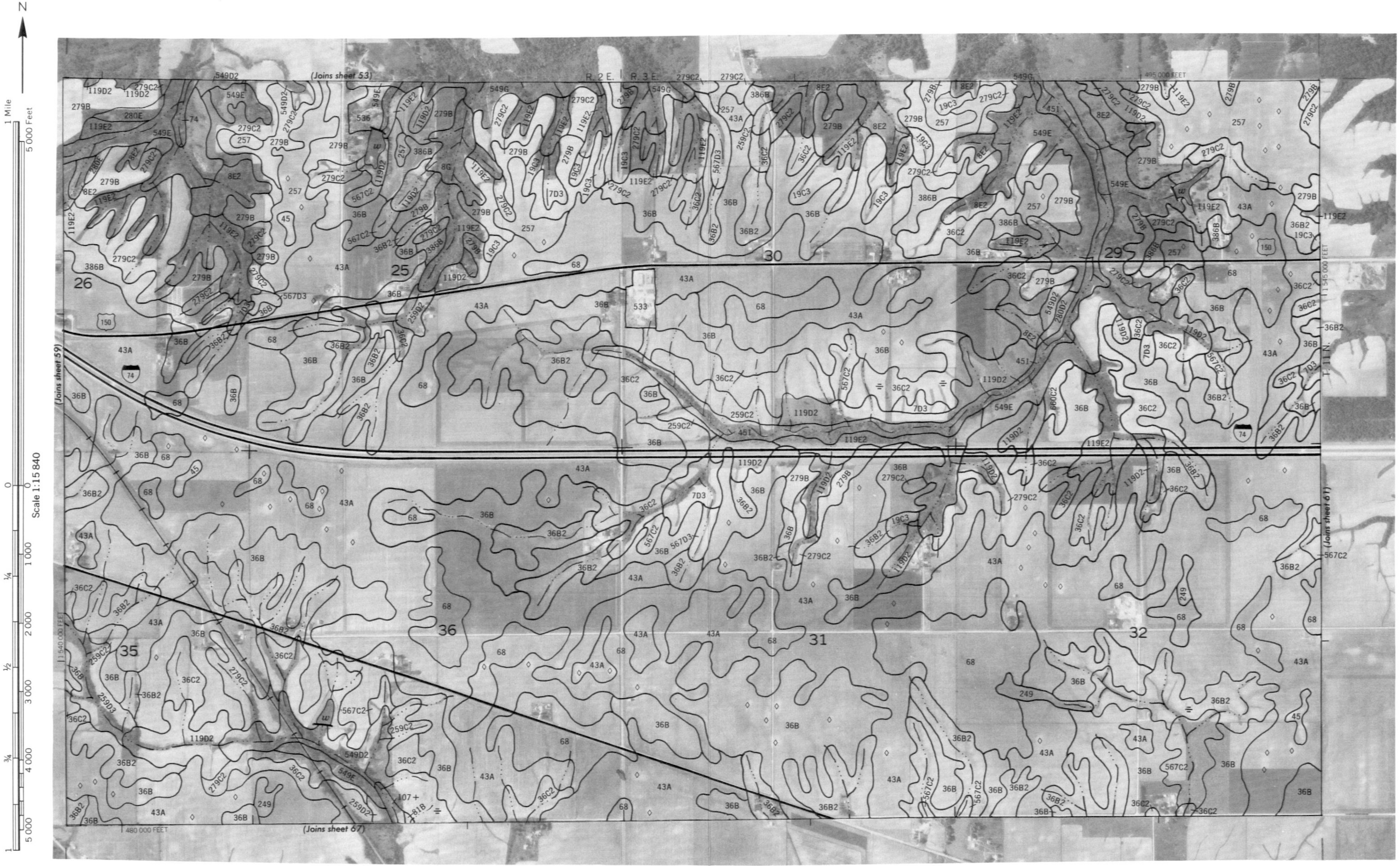
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 58



KNOX COUNTY, ILLINOIS NO. 59

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



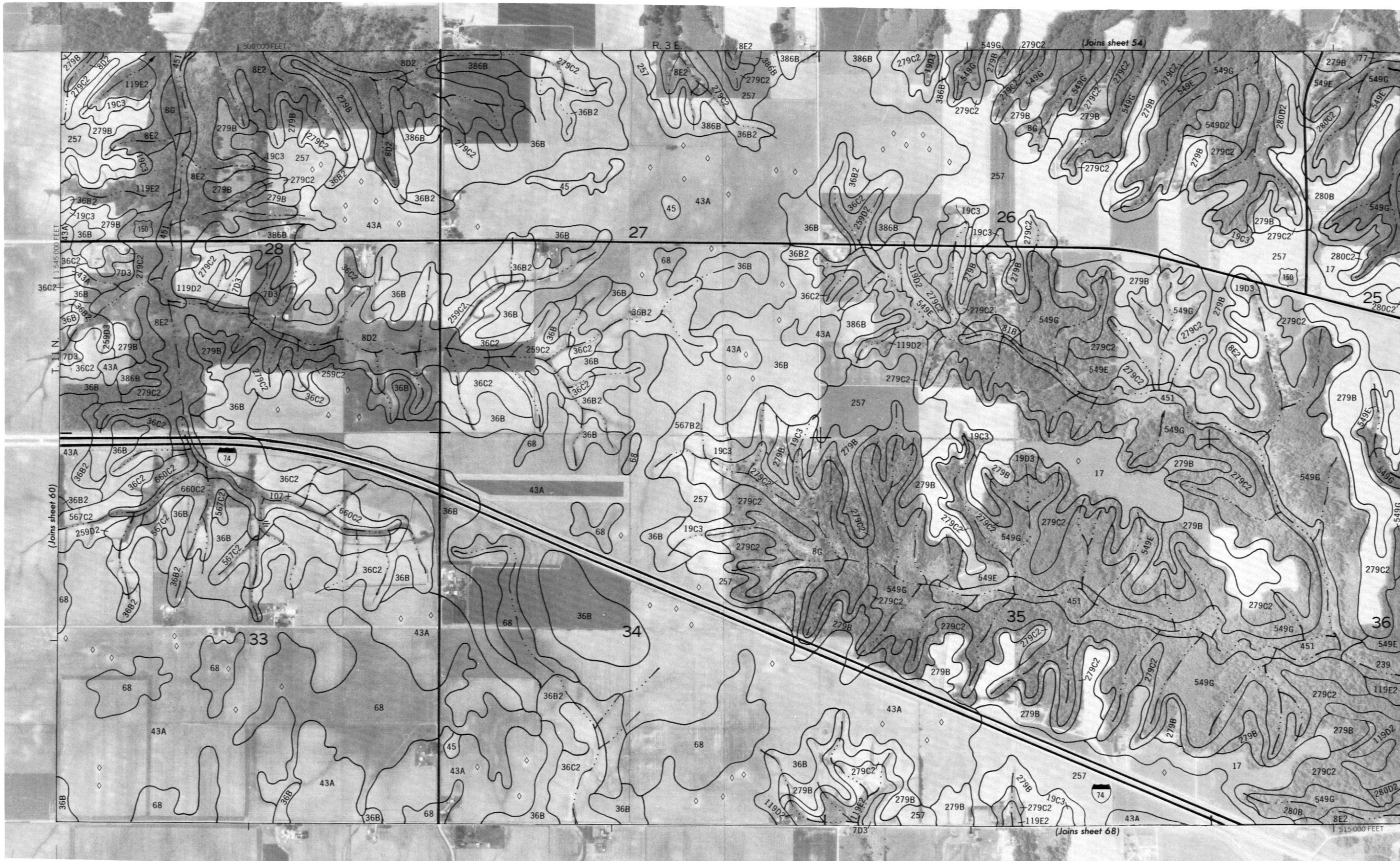
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

61

N

KNOX COUNTY, ILLINOIS NO. 61

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



1 Mile

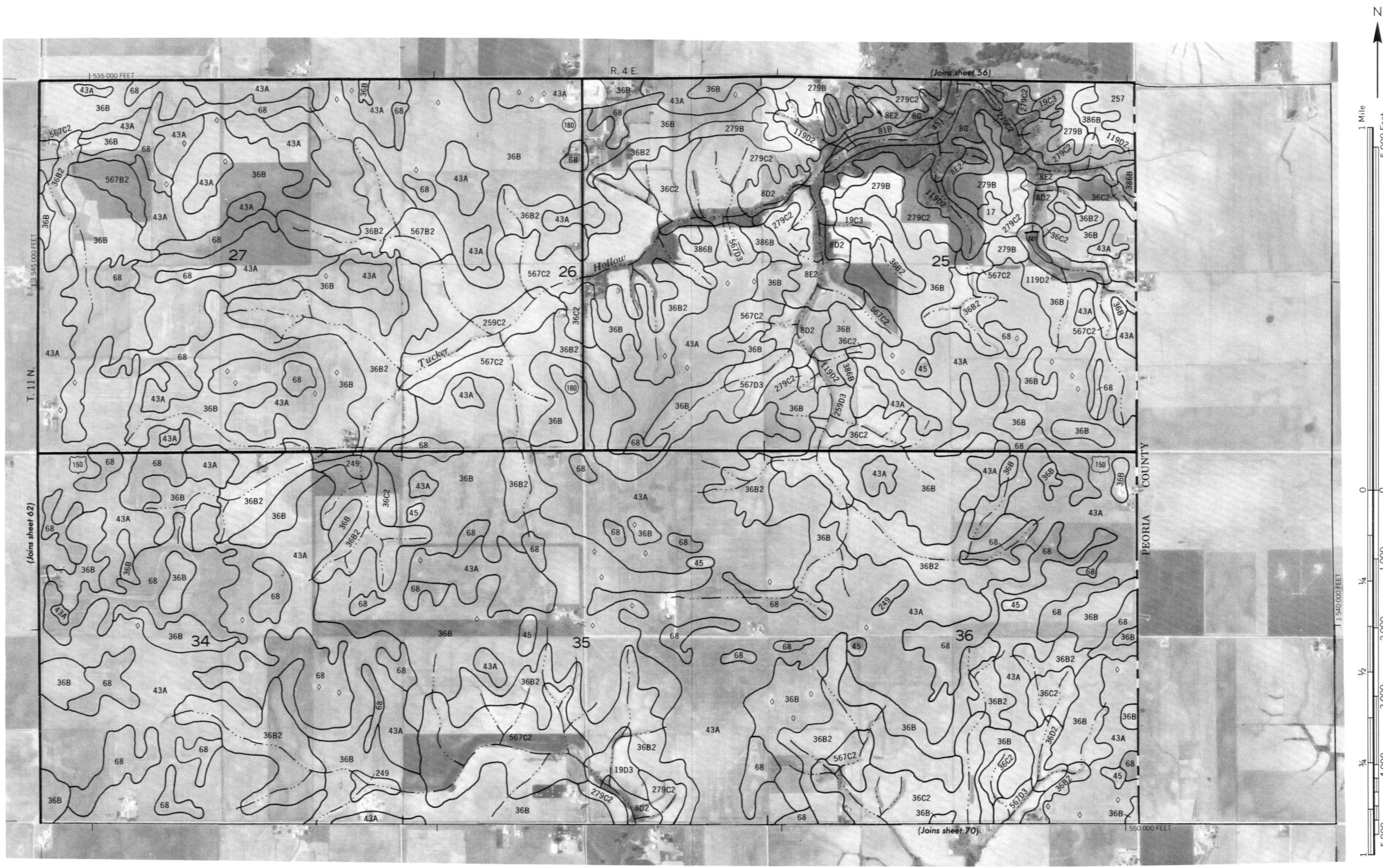
5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



KNOX COUNTY, ILLINOIS NO. 63

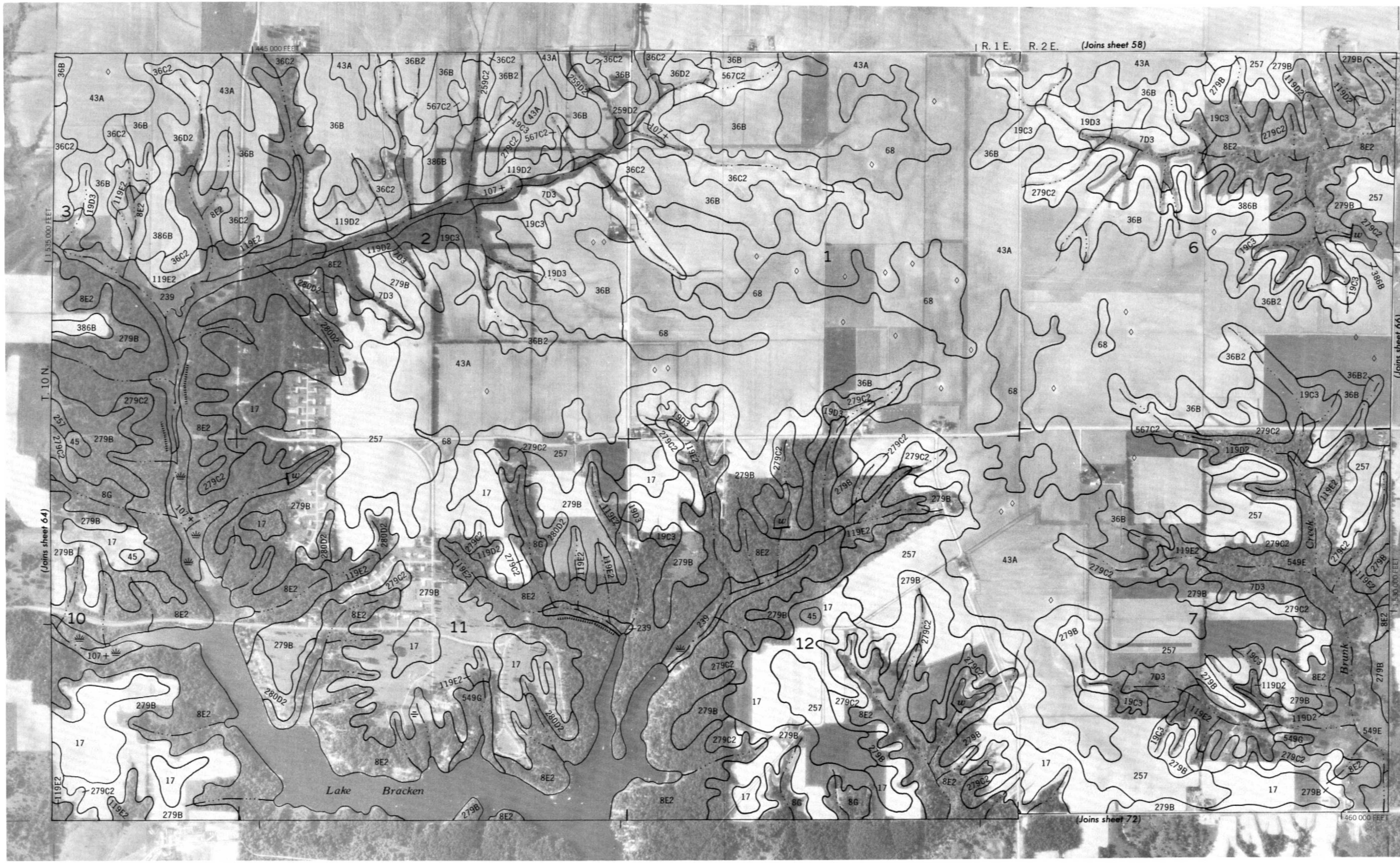
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile
5 000 Feet
Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

65



N

Scale 1:15 840

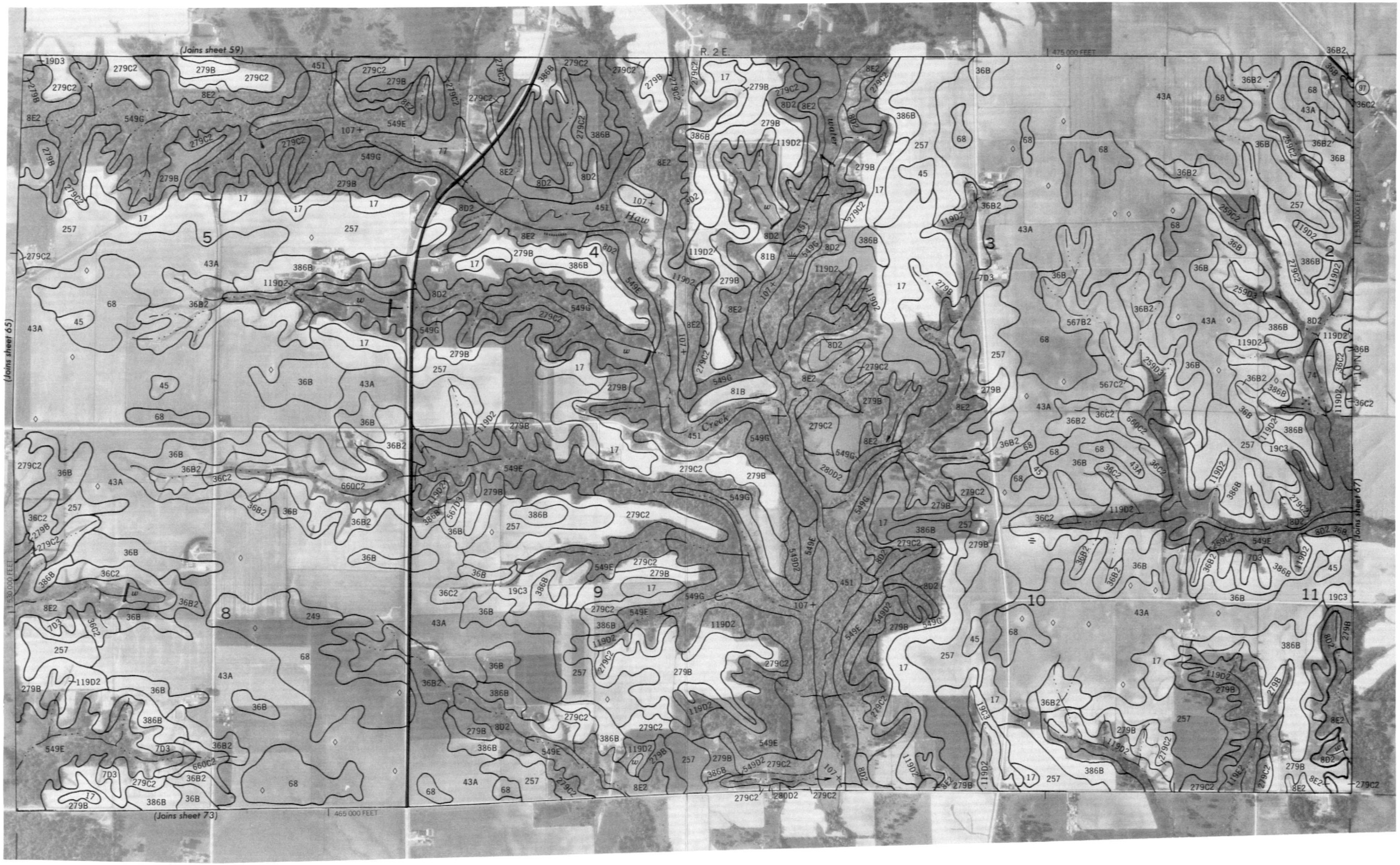
1 Mile
5 000 Feet
0 1000 2000 3000 4000 5000
0 ¼ ½ ¾ 1

KNOX COUNTY, ILLINOIS NO. 65

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

66

N



1 Mile

5 000 Feet

Scale 1:15 840

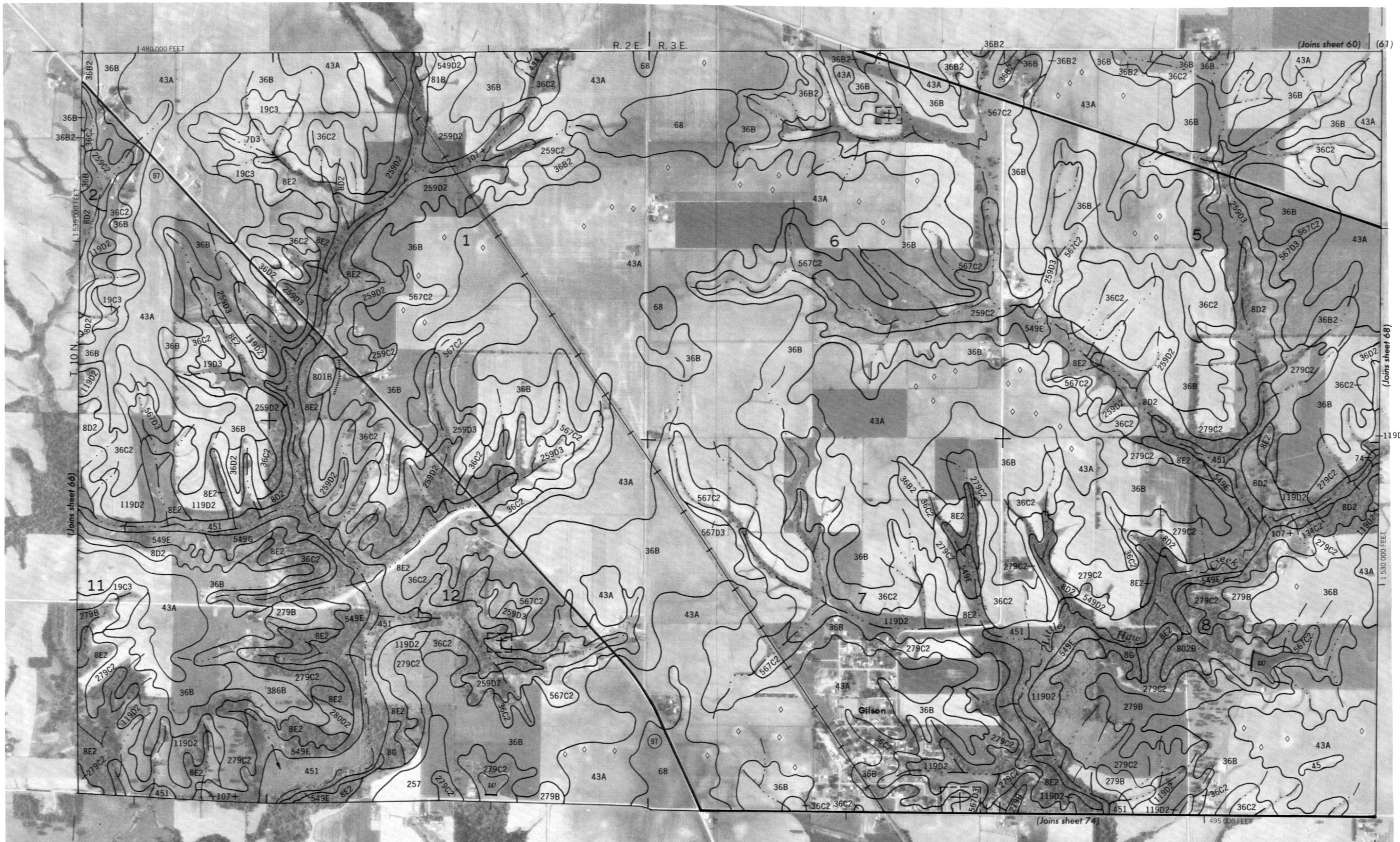
0 1 000 2 000 3 000 4 000 5 000

0 1/4 1/2 3/4 1

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 67

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1000
2000
3000
4000
5000

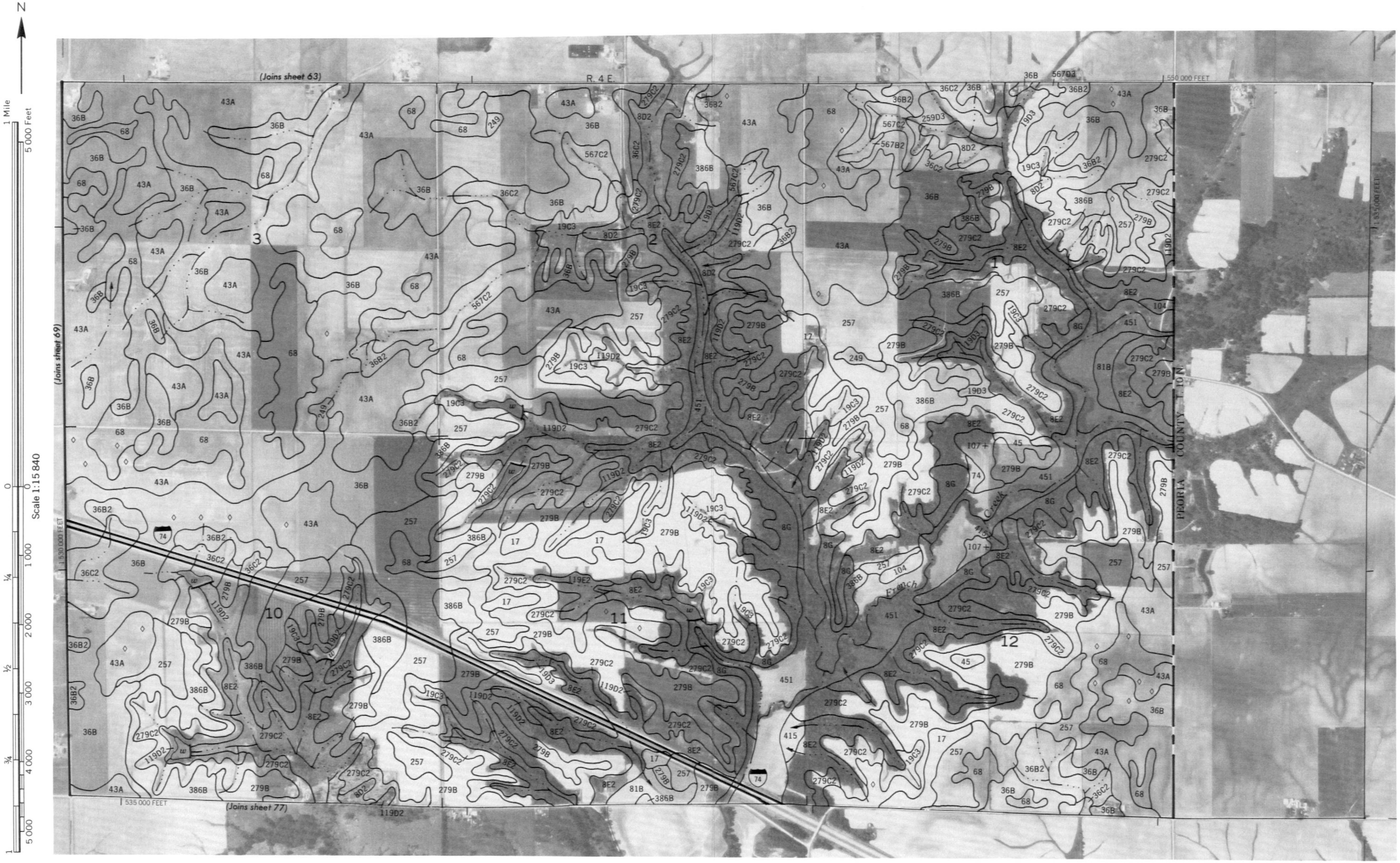
KNOX COUNTY, ILLINOIS — SHEET NUMBER 68

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 68

KNOX COUNTY, ILLINOIS NO. 69

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 70

71

N

1 Mile

5 000 Feet

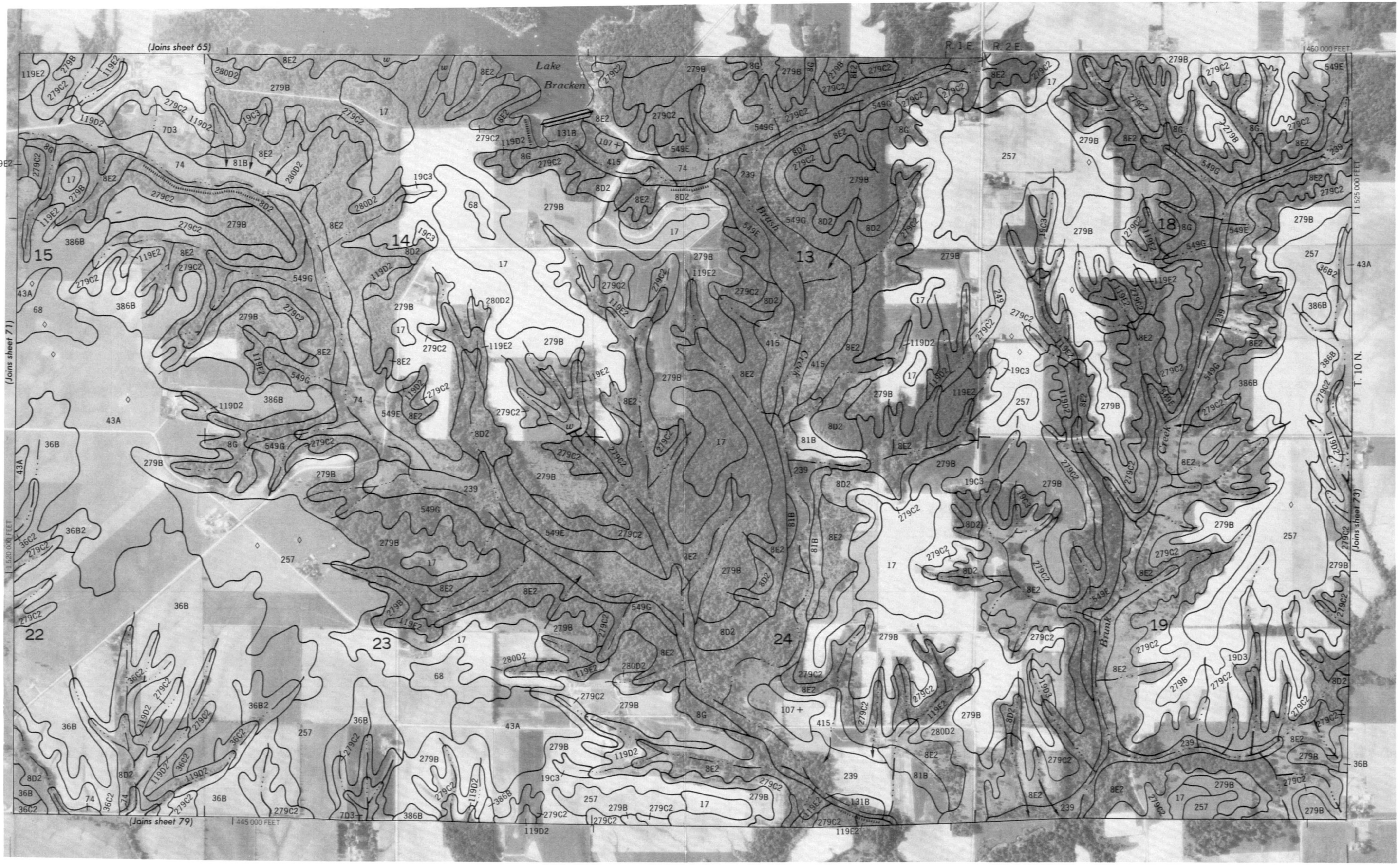
Scale 1:15 840

KNOX COUNTY, ILLINOIS NO. 71

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

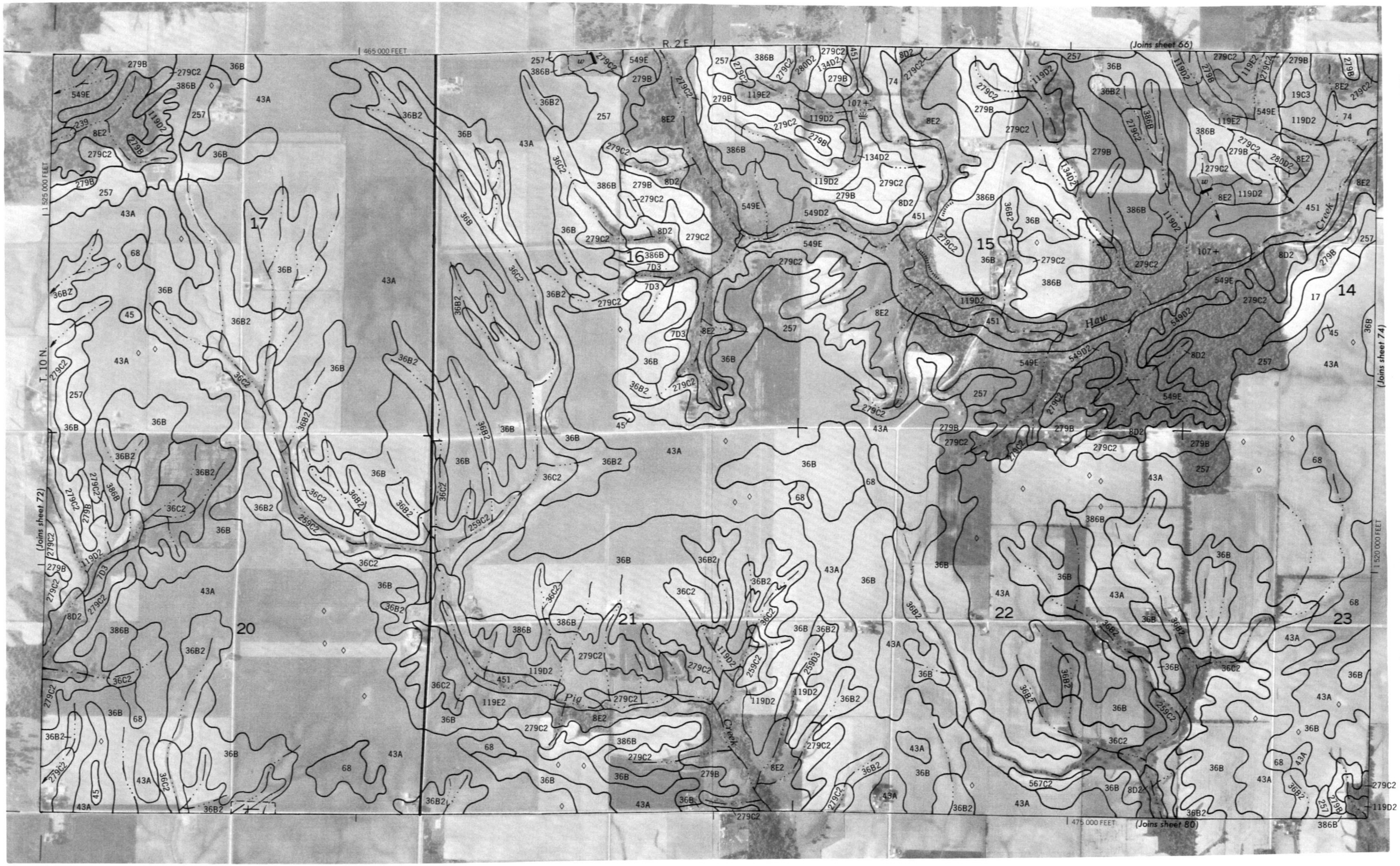
N

1 Mile
5 000 Feet
Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



KNOX COUNTY, ILLINOIS NO. 73

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

KNOX COUNTY, ILLINOIS — SHEET NUMBER 74

N

1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
0
1 000
2 000
3 000
4 000
5 000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

75

N

1 Mile
5 000 Feet
Scale 1:15 840
0 1 000 2 000 3 000 4 000 5 000
0 ¼ ½ ¾ 1

KNOX COUNTY, ILLINOIS NO. 75

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

76

N

1 Mile

5 000 Feet

Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 76

77

N

1 Mile
5 000 Feet
Scale 1:15 840
0 1 000 2 000 3 000 4 000 5 000
0 ¼ ½ ¾ 1

KNOX COUNTY, ILLINOIS NO. 77

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

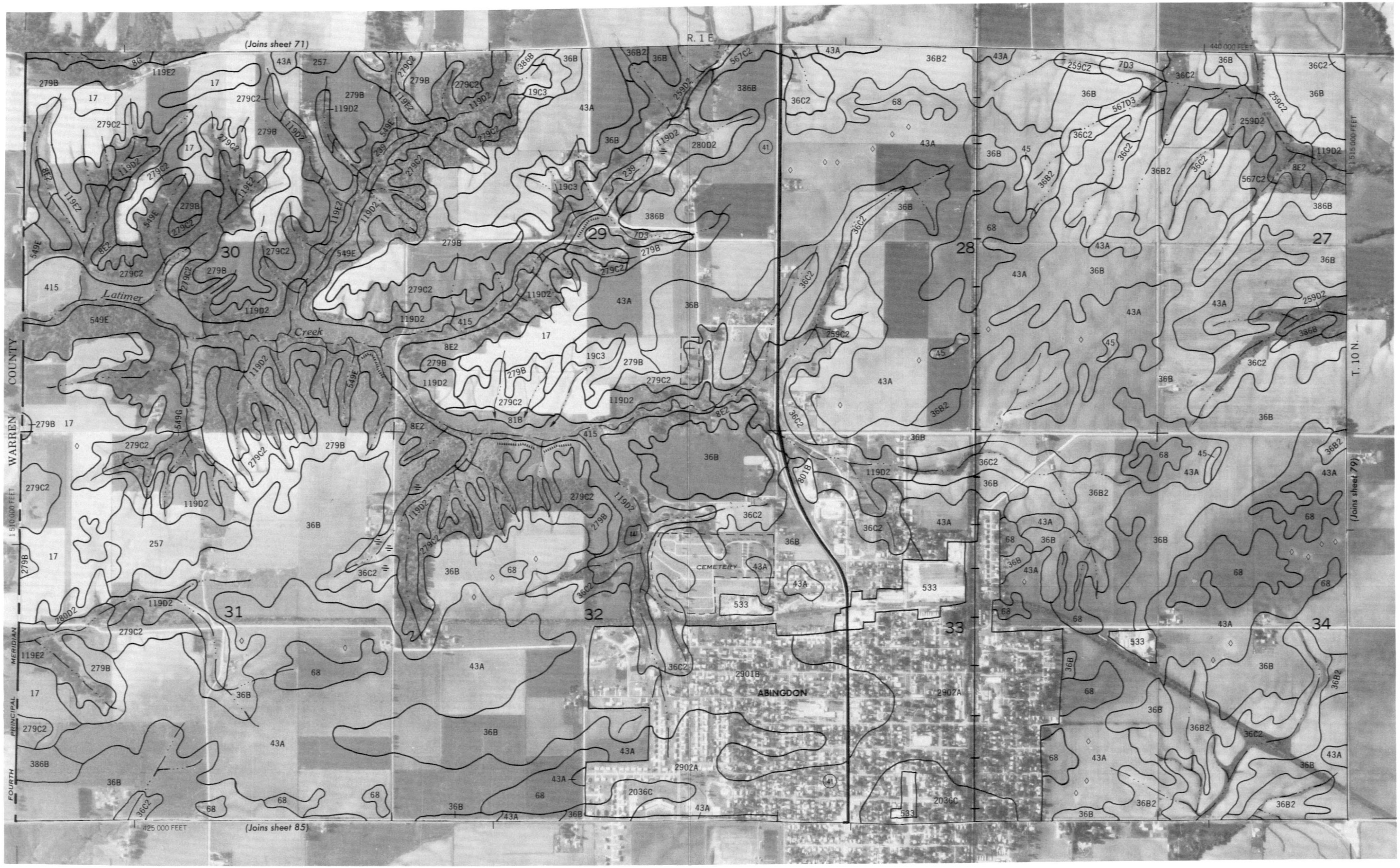
78

N

1 Mile

5 000 Feet

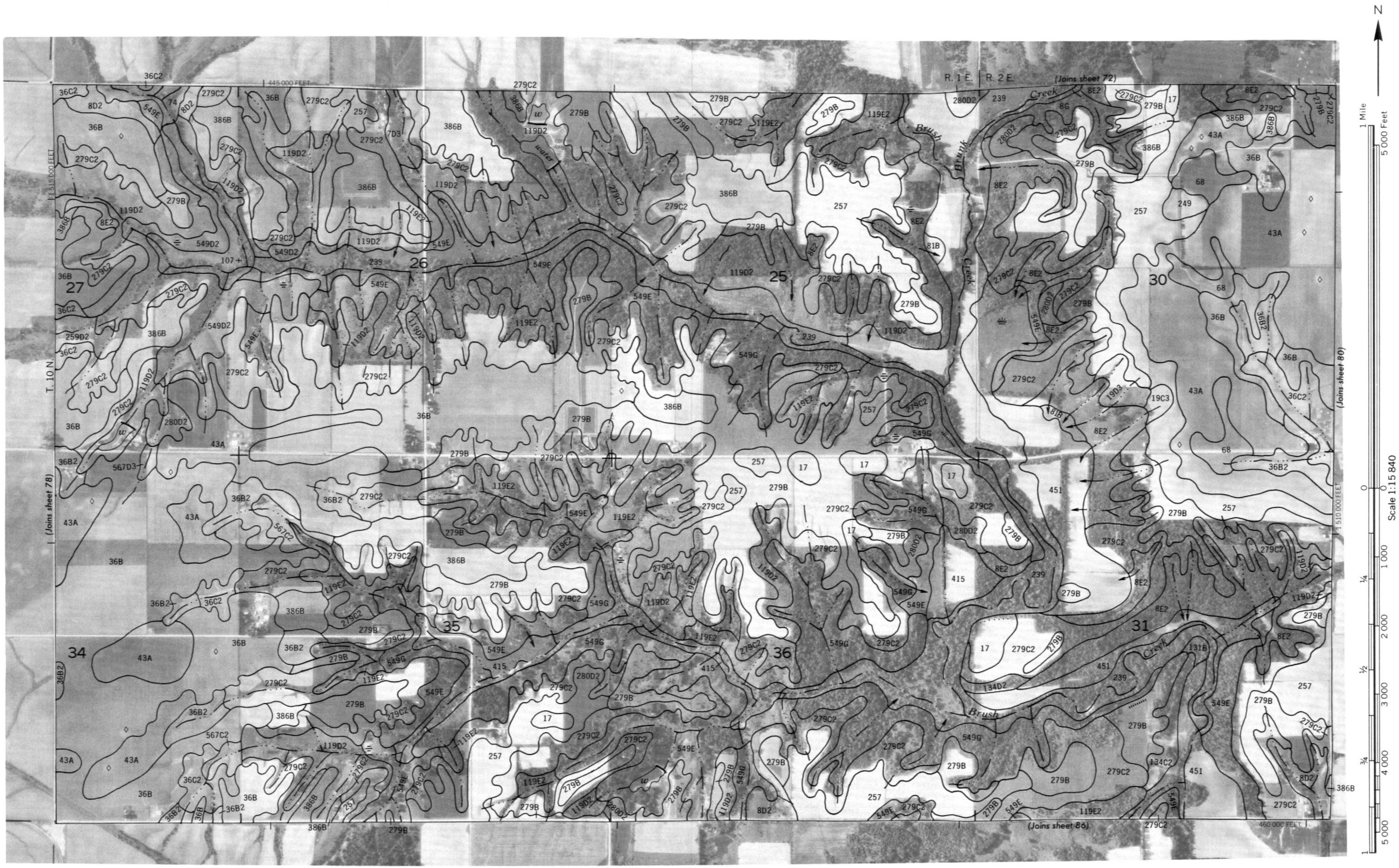
Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 79

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

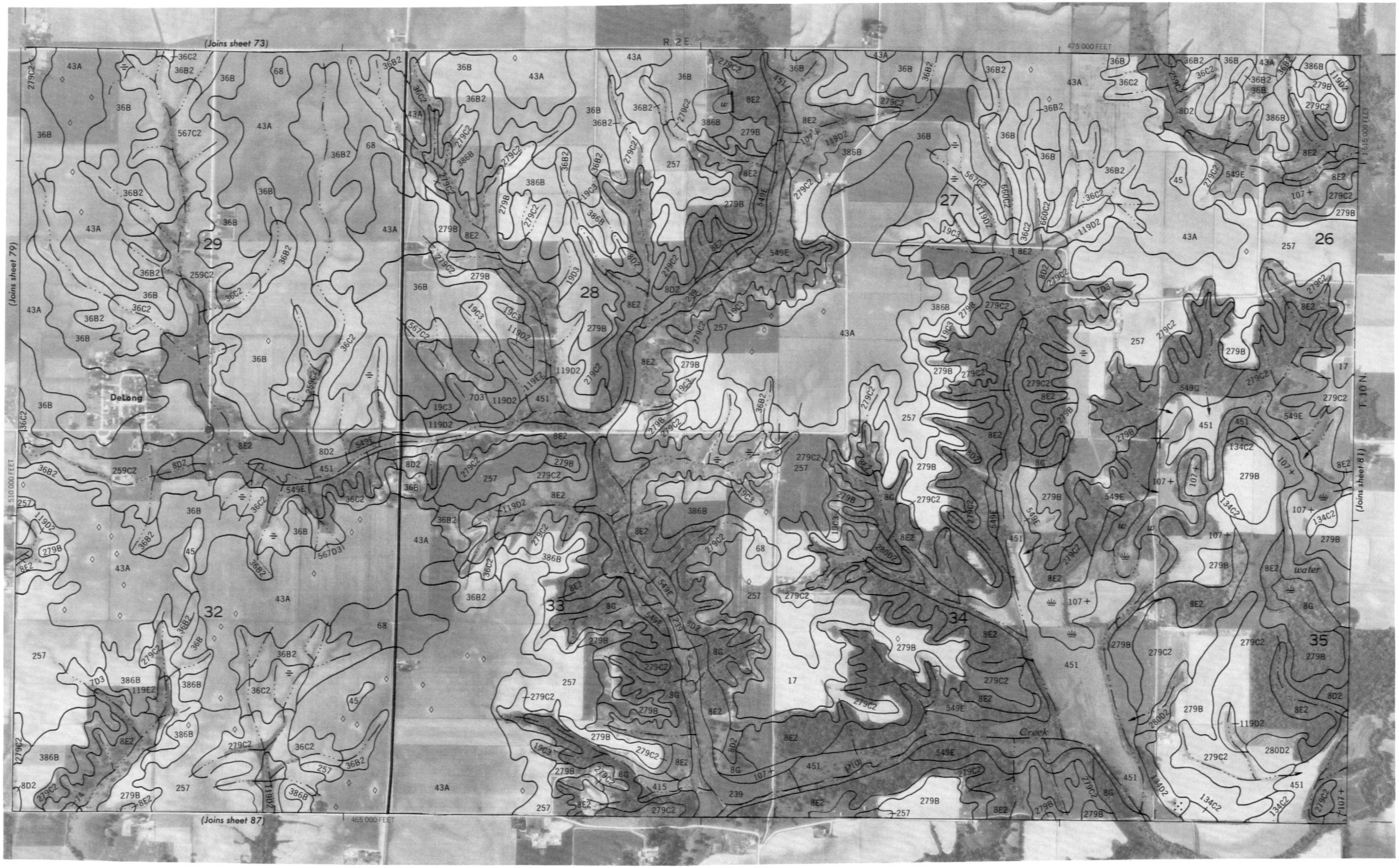
1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

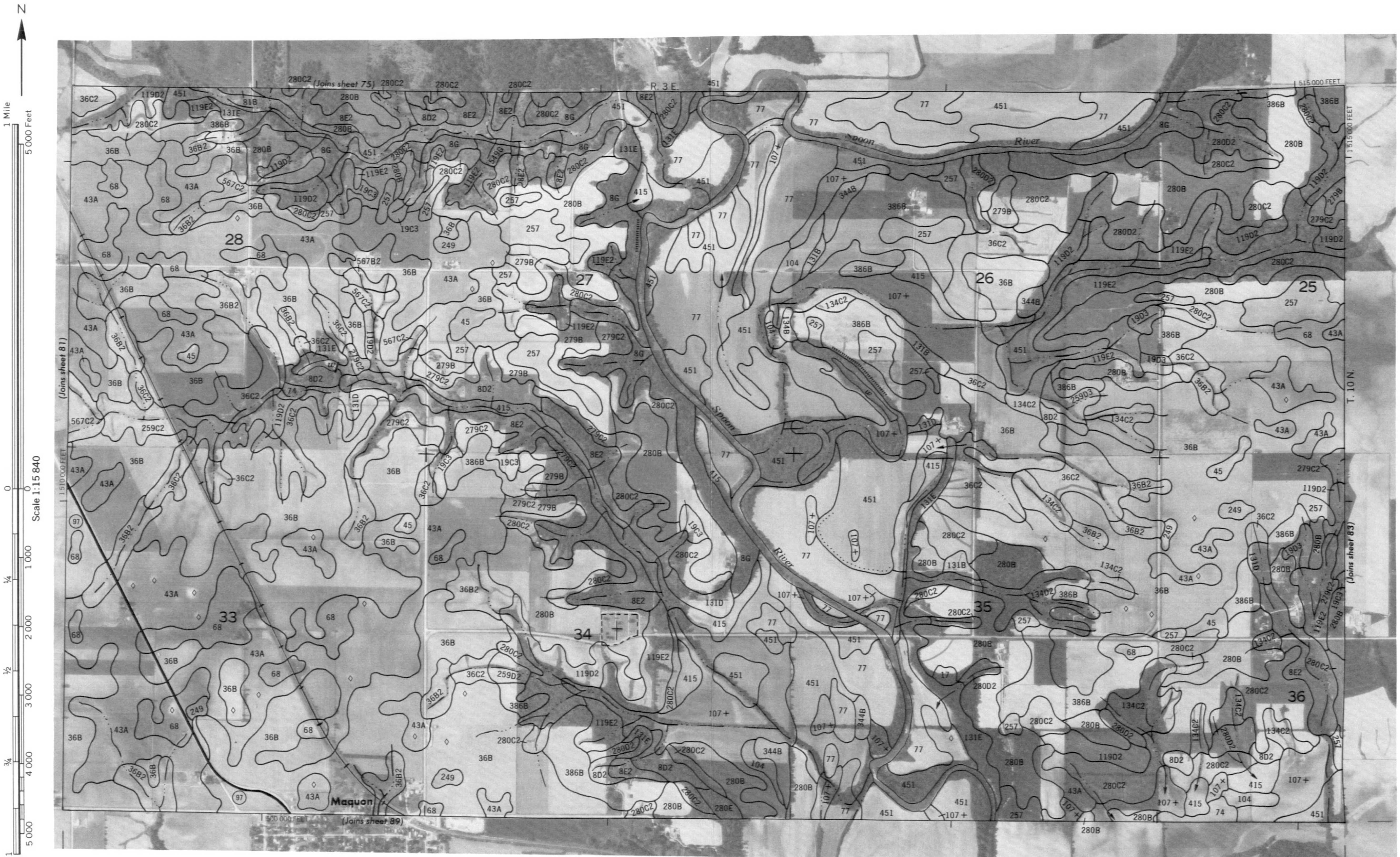


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 81

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS — SHEET NUMBER 82

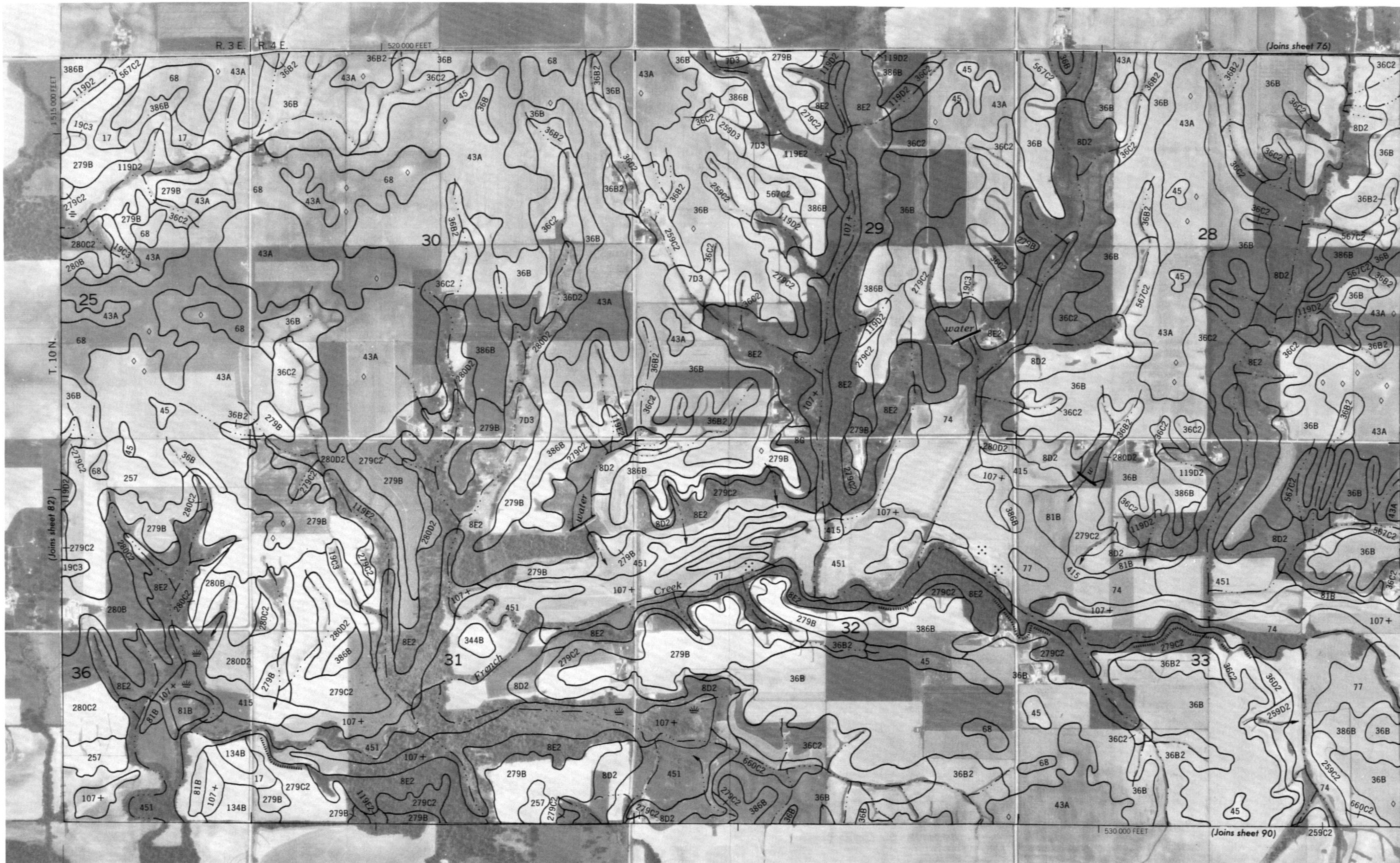


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 82

KNOX COUNTY, ILLINOIS NO. 83

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

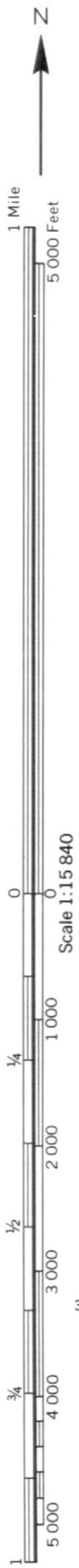
Scale 1:15 840

1 Mile

0 ¼ ½ ¾ 1

5 000 Feet

0 1 000 2 000 3 000 4 000 5 000



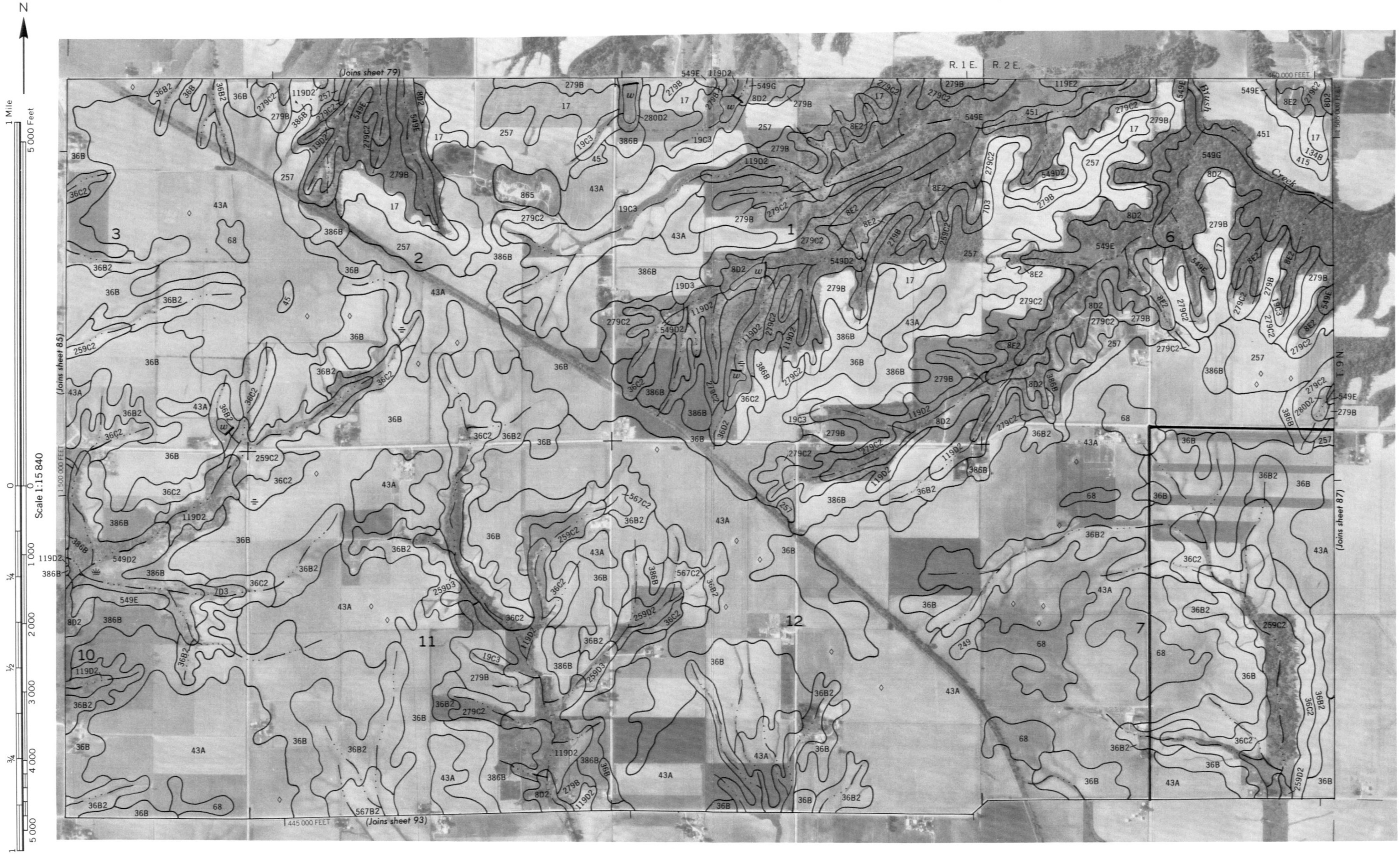
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 84

KNOX COUNTY, ILLINOIS NO. 85

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

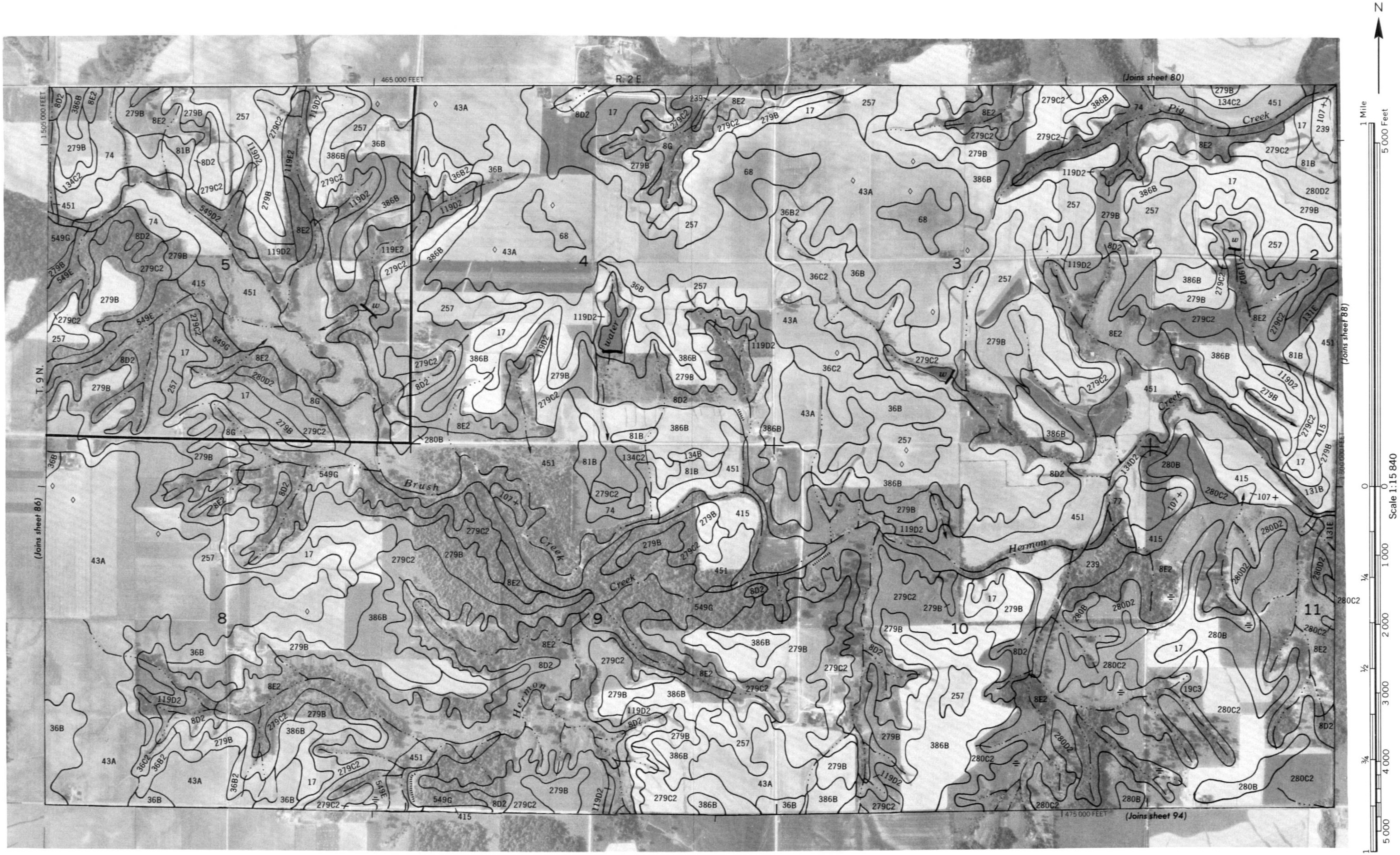
86



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 87

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

1 Mile

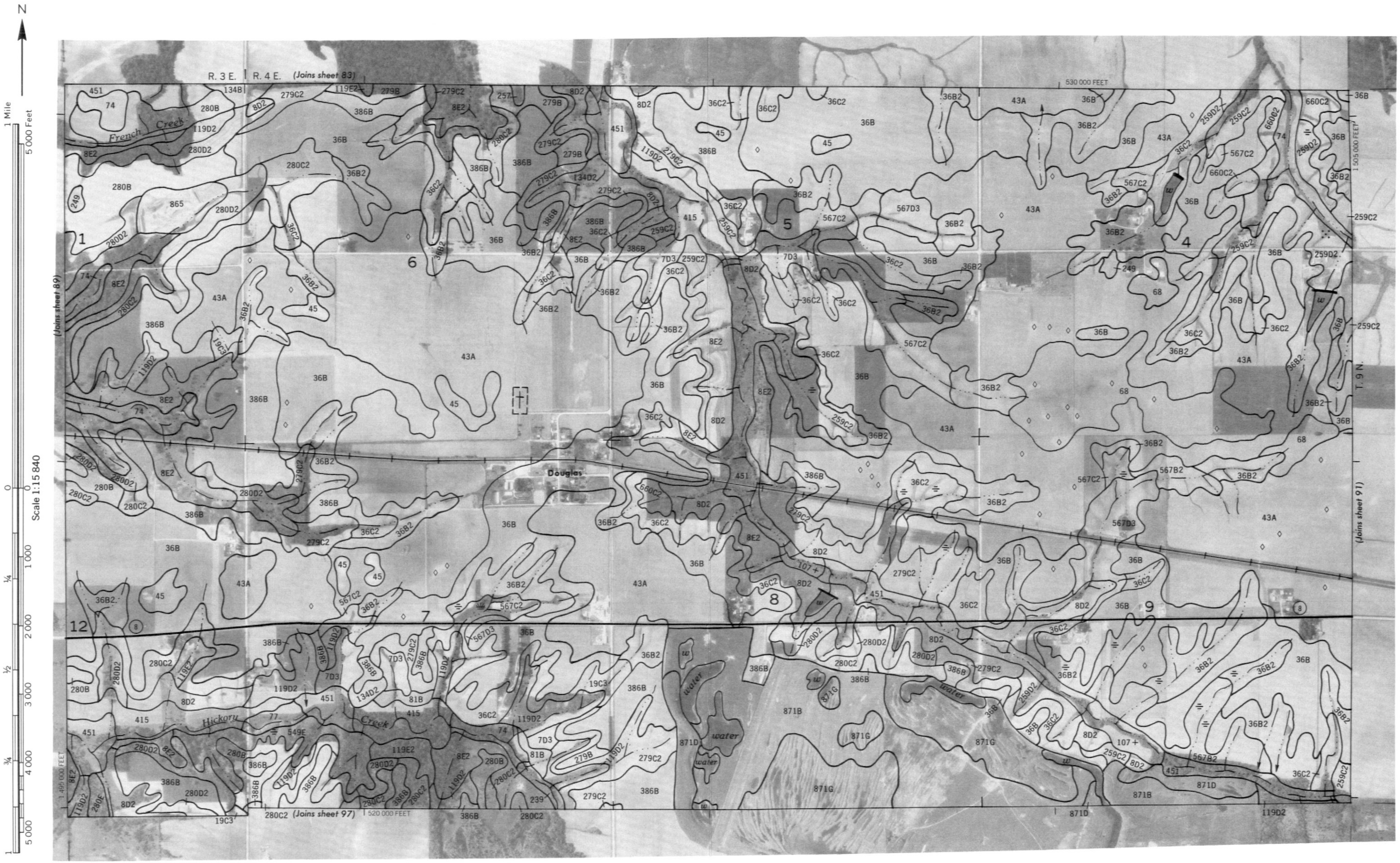
5 000 Feet

Scale 1:15 840

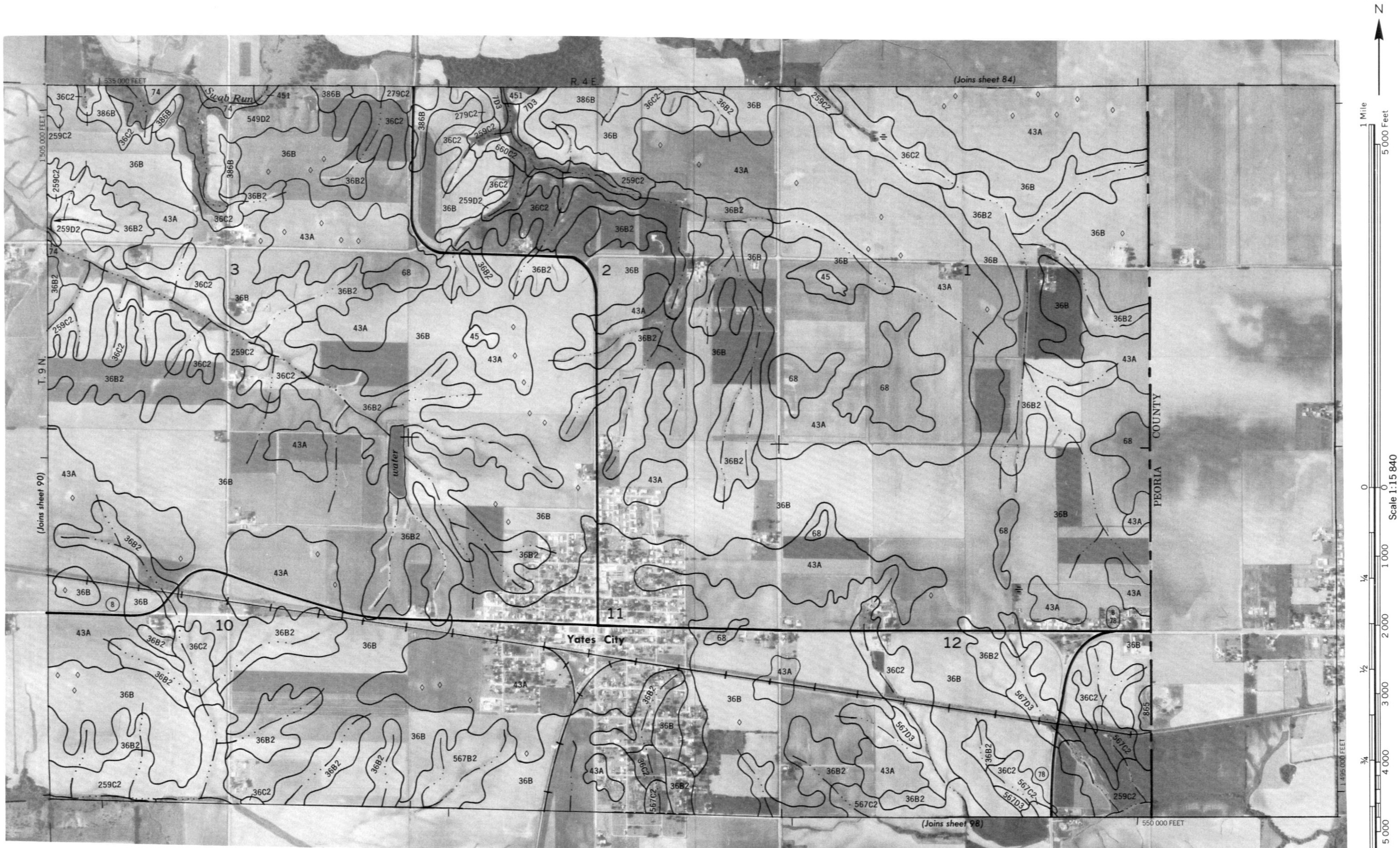
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 89

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

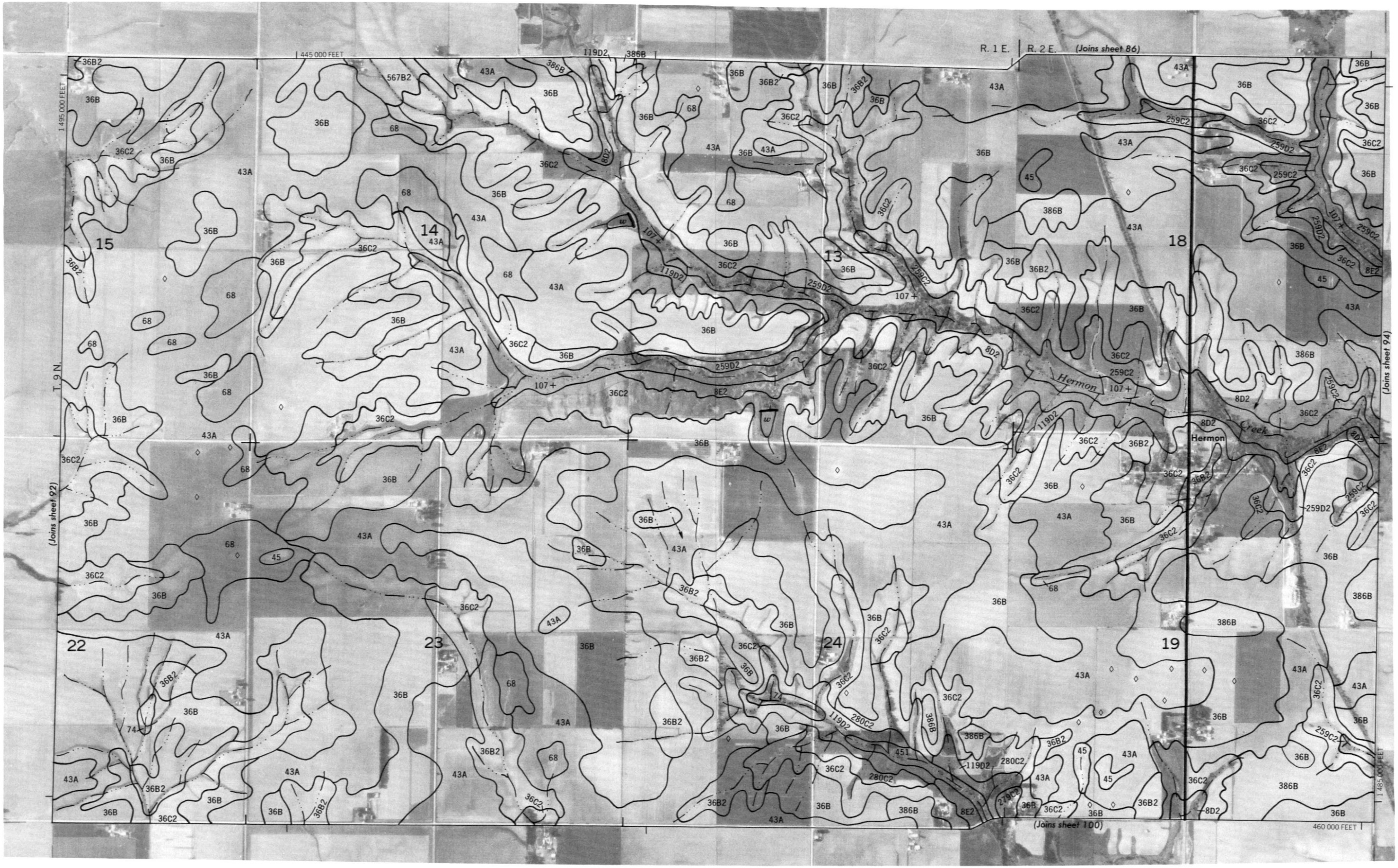


KNOX COUNTY, ILLINOIS NO. 91

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



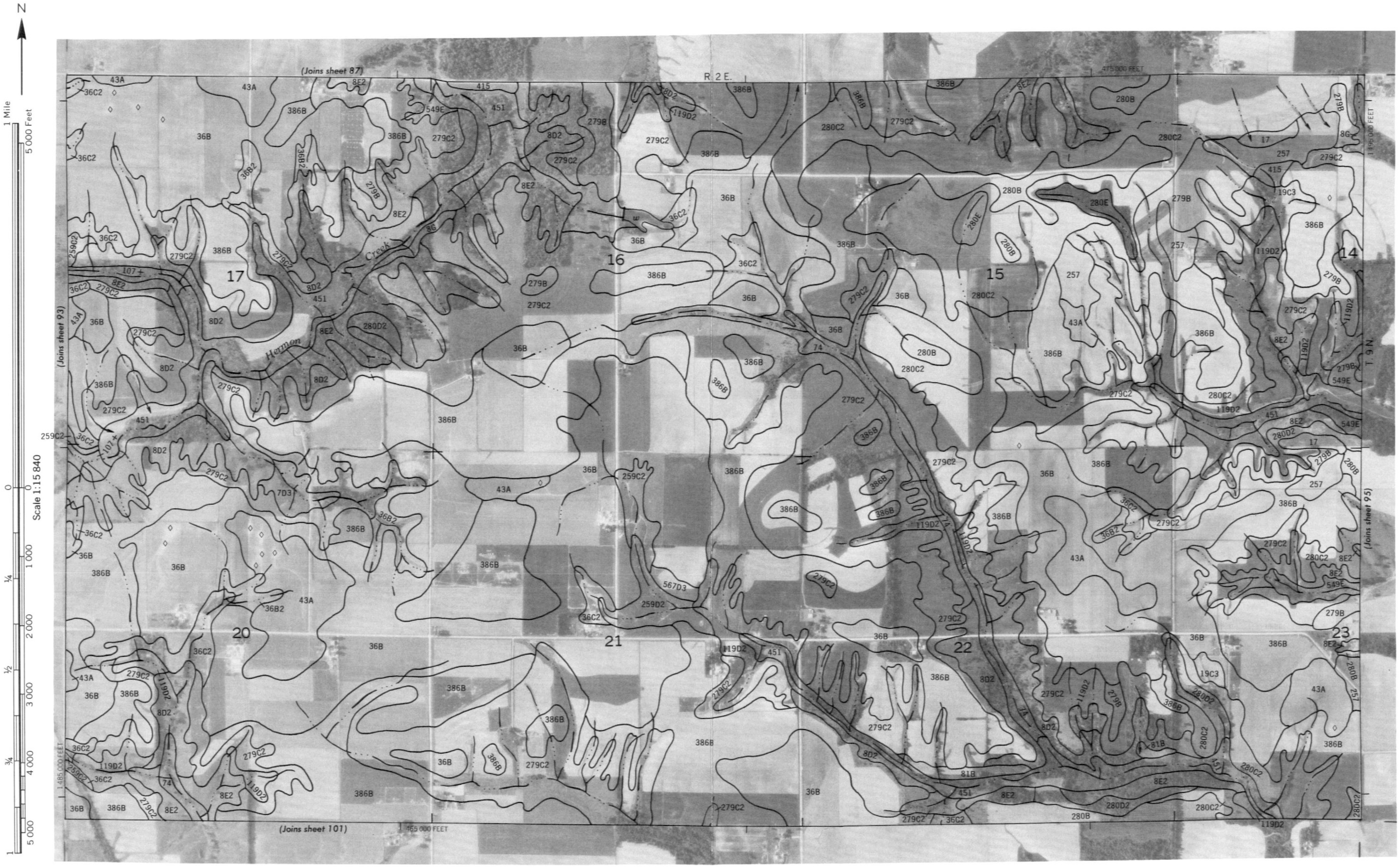
Scale 1:15 840

1 Mile

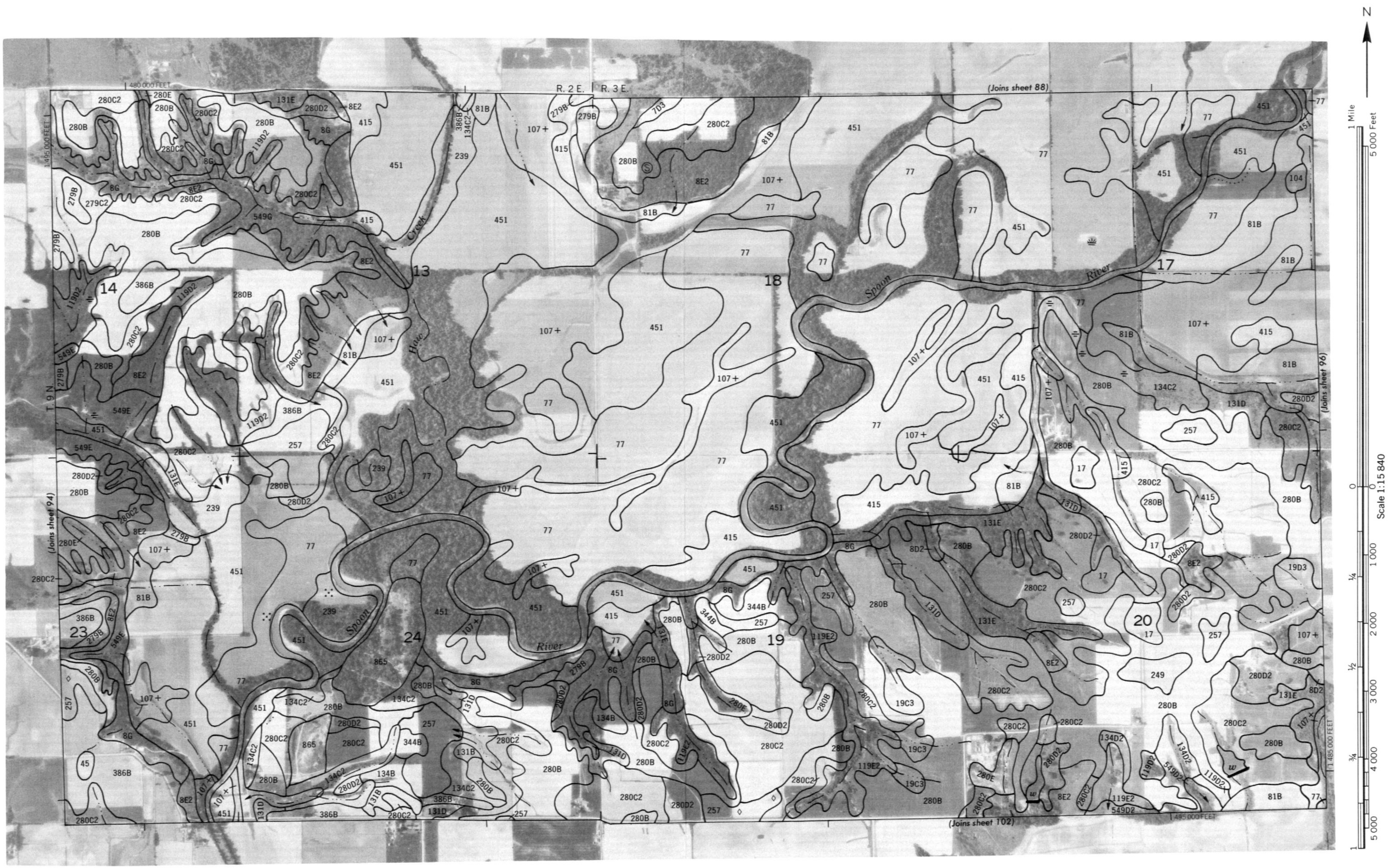
5 000 Feet

KNOX COUNTY, ILLINOIS NO. 93

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

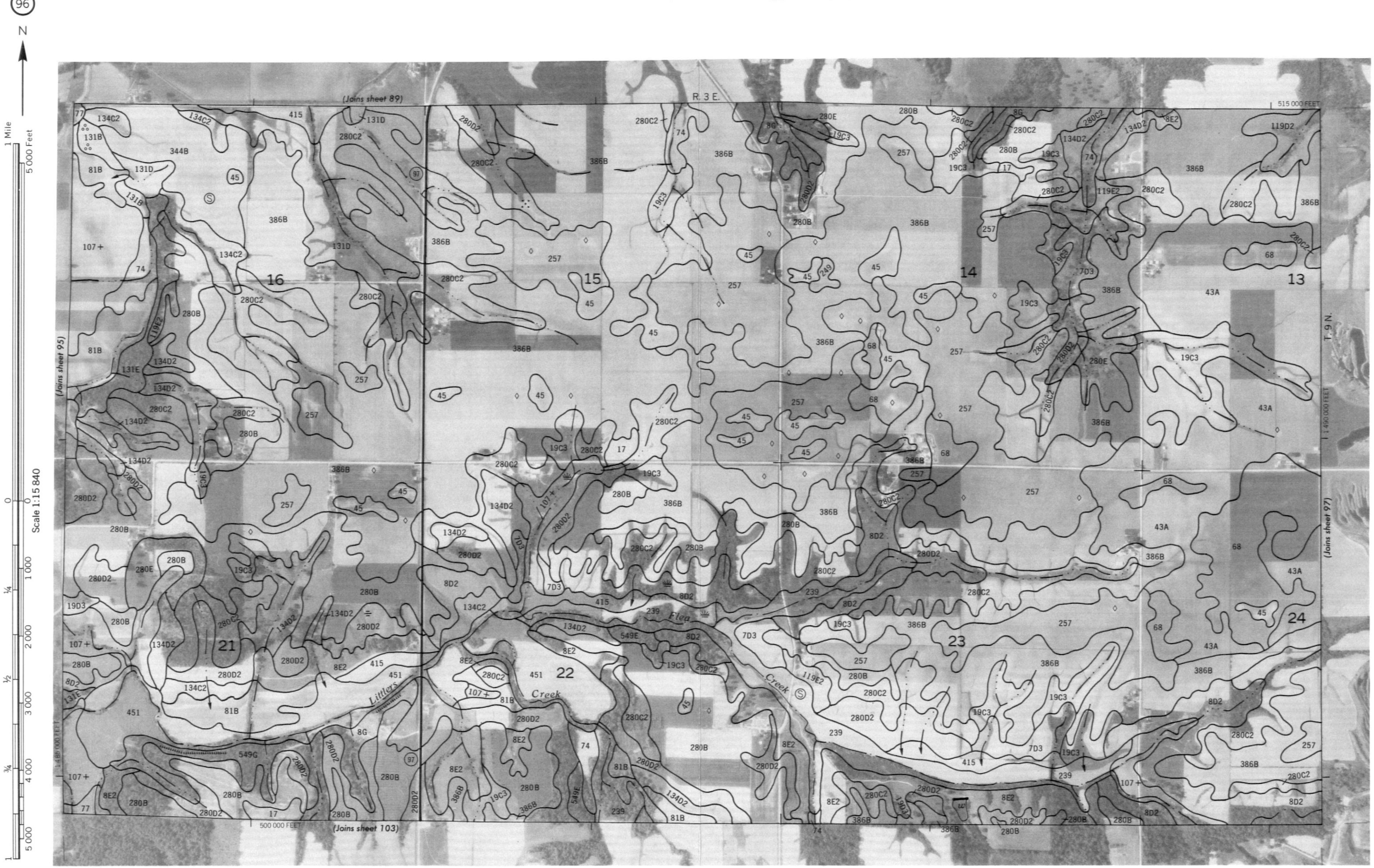


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



KNOX COUNTY, ILLINOIS NO. 95

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 96

N

Scale 1:15 840

1 Mile

5 000 Feet

0 ¼ ½ ¾ 1

0 1 000 2 000 3 000 4 000 5 000

KNOX COUNTY, ILLINOIS NO. 97

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS — SHEET NUMBER 98

N

1 Mile
5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 98

99

N

KNOX COUNTY, ILLINOIS NO. 99

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 Mile
5 000 Feet
Scale 1:15 840
0
1000
2000
3000
4000
5000
¼
½
¾
1

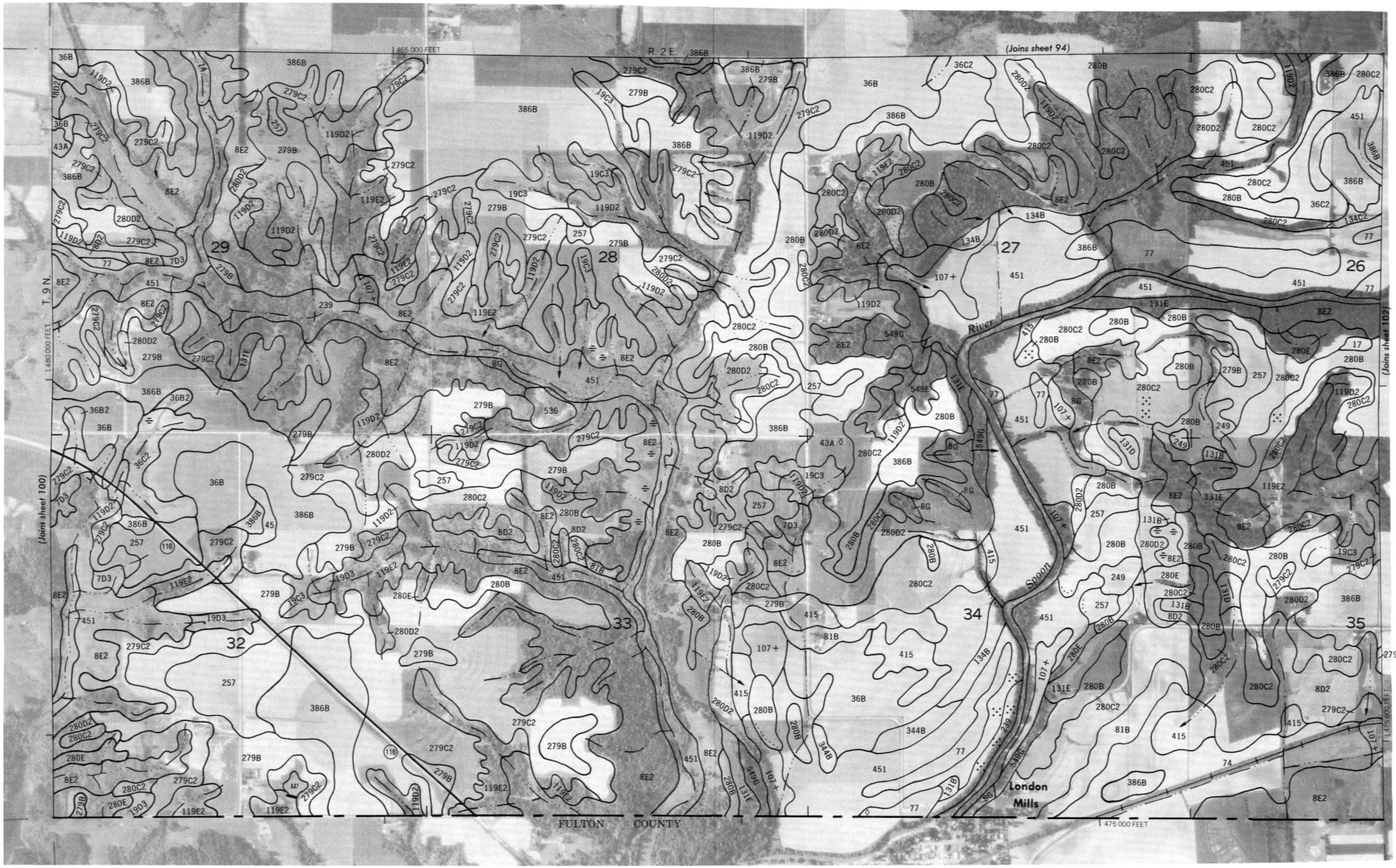

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 93)
(Joins sheet 99)
(Joins sheet 101)
R. 1 E. | R. 2 E.
T. 9 N.
460 000 FEET
455 000 FEET
1 475 000 FEET
1 480 000 FEET
FULTON COUNTY
27
26
25
30
34
35
36
31
water

101

N

KNOX COUNTY, ILLINOIS NO. 101

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



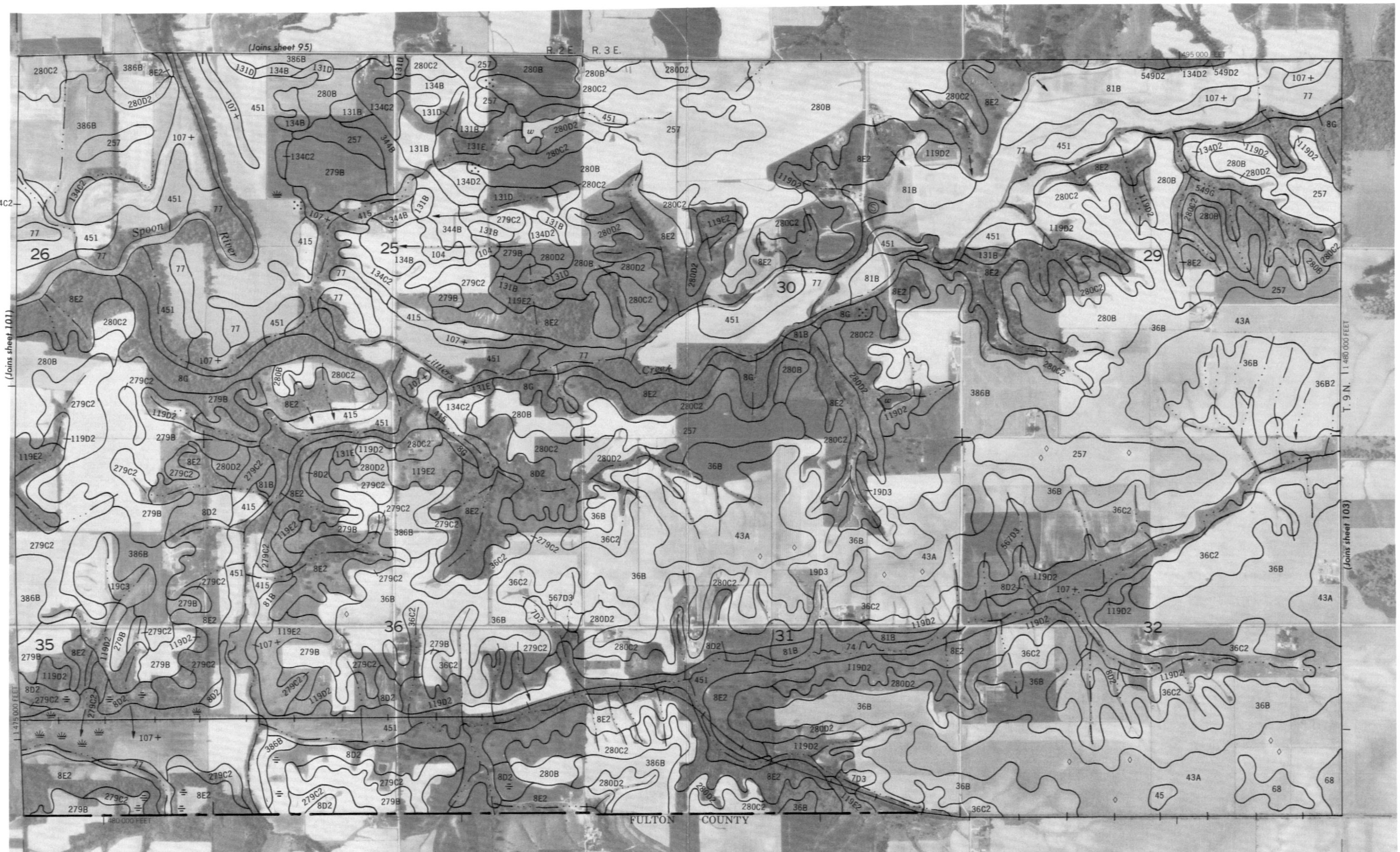
Scale 1:15 840

1 Mile

5 000 Feet

N

1 Mile
5 000 Feet
Scale 1:15 840



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

KNOX COUNTY, ILLINOIS NO. 103

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

105

KNOX COUNTY, ILLINOIS NO. 105

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Coordinate grid ticks and land division corners, if shown, are approximately positioned.